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LAUNCH OF THE RETVIZAN.

The battleship Retvizan, built at Cramps' ship yard, Philadelphia, for the Russian government, was launched on Tuesday in the presence of a distinguished gathering of Russian naval officers and attaches of the United States navy. The baptismal service was conducted by the Rev. Alexander A. Hotovisky, priest of the Russian orthodox church of New York, and the Rev. Elias I. Zotokoff, also of New York, and Rev. Demetrius I. Gobey of Philadelphia. After receiving the congratulations of his guests Mr. Charles H. Cramp said, in speaking of the Retvizan:

"The event we have just seen is one of far more than ordinary importance. In many respects it marks an epoch in American ship building. The Retvizan is the largest and most powerful battleship ever launched in the United States. In character of design, in quality of armor, in speed, in endurance and in the conditions under which her superlative performance must be attained she is the most advanced type of battleship ever launched anywhere. Passing from these to considerations of a more local character, it may be said that certain elements of progress exhibited in the design of the Retvizan were recognized by our own government and may be seen embodied in our own great battleship the Maine, soon to follow her afloat. But what I undertook to do with her in the way of performance was more than our people had ever before required American builders to undertake, and they were induced by the example to materially increase their own requirements. To this extent, we may, therefore, justly consider the Retvizan a pioneer ship. Thus we see that the benefit has been universal in its scope, and the Russian government is entitled to the credit of forcing upon naval architecture and marine engineering a degree of performance not hitherto attempted anywhere and thereby assuming the attitude of leader. Some may say, perhaps, that I had better await the trial of the Retvizan before assuming such an air of confidence. To such I would simply reply: There is the Variag. What has been done can be done again."

The Retvizan is 384 ft. in length, on the water line. Her breadth is 72 ft. 2½ in., and the depth to main deck 43 ft. 10 in. At 25 ft. draught her displacement in tons will be 12,800, which is about the same as that of the new battleships Maine, Missouri and Ohio. The guaranteed speed is 18 knots. The main belt of armor along the sides of the Retvizan will be 8 in. in thickness, treated by the Krupp process. Above the belt the armor will be 6 in. thick. On the protective deck the flat surfaces will be 2 in. thick, while the slopes will be 3 in. in thickness. The motive power will be in two triple-expansion, vertical, direct-acting engines, placed in separate water-tight compartments, and supplied with steam by twenty-four water tube boilers of the Niclausse type, built in this country. The pressure will be 256 lbs. The bunker capacity is 2,000 tons. The Retvizan will carry two turrets, one placed at each end of the central superstructure, in which will be mounted four 12-in. breech-loading rifles. Included in the main battery also will be twelve 6-in. rapid fire guns. The secondary battery will consist of twenty 75-millimetre rapid-fire, twenty 47-millimetre rapid-fire, and six 37-millimetre rapid-fire guns. There will also be two under-water torpedo tubes as well as four above water.

Accommodations for officers and crew will be ample and thoroughly well arranged. On the Retvizan thirty-eight officers will be stationed, as well as 700 men. The electric installation throughout the craft will be ample and complete, and a number of novelties in this particular department are being introduced. All wood work in the interior of the vessel will be rendered fireproof by the electric fireproof process. As the modern warship depends so much upon electric power for the working of her interior mechanism each new vessel shows some advantage over her predecessor in the same class. The Retvizan will be well supplied with electrical apparatus for almost every use except for propelling purposes.

NEXT TO ENGLAND IN NEW SHIPS.

A report from Lloyds showing that on Sept. 30 the United States had, next to Great Britain, the largest tonnage in shipping under construction, is attracting much attention in England. Of course it is understood that the great bulk of tonnage under construction in the United States is for the great lakes and for the protected seaboard trade, but the report from Lloyds has turned attention to our ship yards just the same. The London Statist publishes a long article, in the course of which it points out that the actual and prospective development of ship building in America is even greater than might be inferred from Lloyds report. The Statist considers that the impetus to ship building given by cheap materials and the large demand for tonnage will receive further stimulus from the marketing of American coal abroad, which, the paper says, "is one of the most remarkable economic evolutions of our time." The Statist expects that Americans will soon solve the problem of evolving a type of transatlantic colliers able, like tank steamers, to deliver cargo in European ports without expecting return cargoes. It thinks that this great coal export trade will prove a powerful stimulus to the shipping subsidies bill, and lays stress upon the recrudescence of ship building in New England.

A VERY BUSY SHIP YARD.

It seems only a few months since ship building was resumed in the marine department of the Maryland Steel Co. at Sparrow's Point, Md. The works had been idle for a long time, but the number of orders now in hand is a fair indication of the prosperous condition of ship building throughout the country, notwithstanding our disadvantages as regards the construction of vessels for foreign trade.

The Maryland Steel Co. now has eleven vessels to build and four to repair. The vessels to be built will aggregate 96,580 gross tons displacement and will require 50,000 H. P. to drive them, and this power will take nineteen engines and fifty-two boilers.

REPORTS FROM SHIP YARDS OF THE GREAT LAKES.

A visit made by President Brown of Chicago to the Cleveland headquarters of the American Ship Building Co., a few days ago, was the cause of a report that more vessels were to be built for salt-water service, but it was learned that Mr. Brown's trip to Cleveland was for the purpose of attending a meeting of the executive board of the company at which no business of special importance was transacted. More orders will undoubtedly be secured by the lake consolidation for ships to go to the seaboard, but there would be no object in hastening any negotiations of this kind now, as the several yards have all they can do until next spring. It is expected that the four steamers building at Chicago for Charles Counselman and others will be launched during January and February. It is the intention to have these vessels make a trial at the outset of direct freight service between Chicago and Liverpool. Of course they can only load to about two-thirds of their capacity going through the Canadian canals of the St. Lawrence and then take an additional cargo at Montreal. If the experiment is not successful the vessels can engage in lake trade or in the Atlantic coast trade, but their owners have hopes of finding profit from the beginning in the combined lake and ocean traffic. W. H. Prime, who has been quite prominent in insurance matters on the lakes, organized the syndicate that is building these vessels and is looking after the work of providing business for them. If the venture is successful there will be some glory in having established the first through line of steamers between Chicago and Liverpool. It is reported from Buffalo that J. L. Crosthwaite of the Atlantic Coast Steamship Co., who has had two steel vessels constructed on the lakes (one at the Craig yard, Toledo, and the other at the Union Iron Works, Buffalo) for lumber trade on the Atlantic seaboard, will shortly make arrangements for another vessel or two of the same kind. The Crosthwaite steamer nearing completion at Buffalo will be named Georgetown. The other steamer, named Waccamaw, and which was built at Toledo, was not greatly detained on account of the accident to one of the Canadian canal locks and is now on her way down the Atlantic coast.

The report that the Detroit & Cleveland Navigation Co. would lengthen its Lake Huron steamers City of Alpena and City of Mackinaw during the coming winter is not without some foundation, but probably only as regards one of these side-wheelers. As noted in these columns some time ago, Gen. Mngr. Carter of the D. & C. Co. is of the opinion that a couple of fast passenger steamers, first-class in every way, would pay on the route between Detroit and Buffalo. If he had his way in the matter vessels for this service would probably now be under construction. An alternate scheme, temporary in its nature, was to make alterations in one of the steamers of the D. & C. Co.'s Lake Huron division so as to give her a trial on the Buffalo-Detroit route during the Pan-American exposition next summer. The side-wheel steamer City of the Straits, which has been engaged in excursion business out of Cleveland for several seasons past, would take the place of the vessel taken off the Lake Huron division. But with the Detroit Ship Building Co. crowded with work for the coming season it is probable that not even this temporary change will be attempted.

All talk of a passenger boat service between Buffalo and Detroit next season will probably end with the official announcement from Mr. T. F. Newman that the Cleveland and Buffalo Transit Co. is to have the side-wheel steamer City of the Straits join the two regular Cleveland and Buffalo steamers (City of Erie and City of Buffalo) on the route between Cleveland and Buffalo, while the Pan American exposition is on at Buffalo next year. As the City of the Straits is to be taken off the Cleveland-Toledo-Put-in-Bay route it will be necessary to make improvements in the two other steamers of that service—State of Ohio and State of New York. The Detroit Ship Building Co. will, during the winter, give the State of New York new boilers with Howden draft appliances, and feathering wheels will also be fitted to that vessel. The State of Ohio will also undergo some alterations.

James Davidson and James E. Davidson announce the completion of the new dry dock at their ship yard, West Bay City, Mich. This dry dock is 435 ft. long, 60 ft. wide at gate, 100 ft. wide on top and 14½ ft. deep over sill. It embodies the very latest ideas in engineering skill and is supplied with the improved machinery of all kinds for doing work quickly and economically. The pumps are being adjusted, the work of removing the coffer dam will be commenced in a few days and the new dock will be ready for business Nov. 1. The work of rebuilding and enlarging the Bay City dock will be commenced as soon as this dock is opened, so that by the opening of navigation next spring the Davidsons will have two dry docks in operation.

Mr. J. C. Gilchrist of Cleveland will probably give names of the planets to the fleet of 5,000-ton steel steamers building for him at different lake yards. Of the eight new vessels, two will be owned by transportation companies already organized and which control the Gilchrist wooden vessels. The other six will be owned by a new corporation, the Globe Transportation Co., and they will be named Mars, Saturn, Neptune, Uranus, Jupiter and Venus. The letter G in the word globe is also the first letter in the name Gilchrist.

It is announced from the navy department that there will be a winter cruise of the North Atlantic squadron, but the number of vessels participating in it will be as small as last year. Rear Admiral Farquhar has transferred his flag to the battleship Kearsarge, and with that vessel and the battleships Massachusetts and Alabama he will proceed to the West Indies, visiting Havana and other Cuban ports, San Juan de Porto Rico, Santo Domingo, Hayti and other islands, and will go as far south as La Guayra, Venezuela. In February the squadron will return to the United States. It is the intention of the navy department to keep the squadron employed at sea more than has been the custom in previous years. Much attention will be given to actual maneuvering and target practice.

REAR ADMIRAL MELVILLE'S REPORT.

THE ENGINEER-IN-CHIEF OF THE NAVY SOUNDS A NOTE OF ALARM ON THE OPERATION OF THE PERSONNEL LAW—HE SAYS THAT FORTUNE ALONE HAS PREVENTED CALAMITY—OPPOSED TO THE CONSOLIDATION OF THE BUREAUS OF CONSTRUCTION AND REPAIR, STEAM ENGINEERING AND EQUIPMENT.

The annual report of Rear Admiral Melville, engineer-in-chief of the United States navy, which has just been given to the public, is both interesting and voluminous. After dealing with the general operation of the bureau, he discusses the recommendation of Secretary Long, contained in his last annual report, that the bureaus of construction, steam engineering and equipment, be consolidated into the bureau of ships, under one head. He thinks the consolidation would lessen the efficiency of the department, and says:

"In view of your recommendations to congress in your last annual report relative to the consolidation of the bureaus of construction and repair, steam engineering and equipment into one bureau of ships, I must ask your attention to a few facts, arguing not only against the advisability of such a course, but proving to my mind that such a combination would materially lessen the efficiency of the administration of the navy department. In every large ship building establishment the bureau system actually prevails to a more complete separation of the special branches of the work than has ever been practiced in the navy. Nominally there is a head of each concern, but no pretense is ever made by that head of possessing expert knowledge regarding all the branches of the establishment. Frequently this head is not a technical expert at all, but simply a good 'general manager,' even though he has another 'general manager' under him and also an expert chief for each separate division. Every tendency is to increase specialization in work, owing to the ascertained value of system whereby leading talent in each department may devote itself to the advancement of its particular branch, and not be diverted therefrom through a maze of miscellaneous and unrelated work. Your impression that the work of the three bureaus is an integral work is certainly not gained by a close examination of the character of their separate specialties, as from that you would be compelled to acknowledge the entire lack of corelation and the absolute necessity of retaining actual (however nominally designated) separate bureaus, and separate corps of experts for each.

"There is at present already established a 'bureau of ships,' though it is named the navy department, and the head of this bureau is the secretary of the navy. No pretense is made by this head of having expert knowledge in any branch of the work, and for the most efficient control of the various branches he has secured to him the supposedly highest expert talent in each, necessarily depending upon them for carrying out their particular details. He realizes the impossibility of one man's ever possessing the combined education and ability to successfully pose as an expert in all, and he has only to turn to the curriculum of a school of technology to assure himself that a lifelong study in any one mechanical art is needed to secure eminence and utmost proficiency in it. Hence, when the three bureaus named seek a head for their proposed combination, it must either be a 'non-expert' head as a general manager, under whom the same necessity as now would exist for retaining separate expert subheads for each division, or there must be an 'expert' head capable of managing all three efficiently. The first method would merely mean a second assistant secretary of the navy, an additional aid authorized to decide questions at issue and harmonize the details in construction. In this the nominal combination would not be real, while the only effect would be to humiliate the chiefs of these bureaus by destroying their nominal integrity and the pride they feel in preserving it. If an 'expert' head, however, is found, able and willing to direct all, where can he be discovered? If it were only to mean the combination of the bureaus of construction and steam engineering, the effectiveness of the scheme would be as impossible as the combinations of all naval bureaus.

SPECIALIZATION THE SUREST ROAD TO SUCCESS.

"If a naval constructor should be found to pose as an expert engineer, it would necessarily mean one of two things—either that he had neglected to a most serious extent the pursuit of his own profession or that his own profession possessed but little requiring absorbing study and great experience, and therefore gave him the needed time for the study and pursuit of engineering. This must be true, because the necessary ability to fully control the general supervision of design and construction of machinery cannot come from book lore only, but must be perfected by that extended and intimate acquaintance with machinery which long years of experience alone can give. This is a fact, not an opinion, and one which no eminent engineer in the world can or would deny. On the other hand, if an engineer should pose as the expert head of the combination, I am sure a similar statement, with professions reversed, would be made by the constructors, or at least I am confident that they would scarcely acquiesce in a supposition that their work is in any degree less absorbing, or requiring less devotion and experience. Of course, if it should be acknowledged that a minor degree of labor is necessary for acquiring the science of naval construction, then the one naturally selected would have to be an expert engineer, owing to the less difficulty in adding a small portion of knowledge to the larger than in the opposite case. Such presumptions, however, are neither plausible nor desirable. The surest road to increased success in naval administration must be along the lines so clearly indicated in civil life, those of specialization and continued subdivision.

"That relief from difficult decisions would come from having the 'non-expert' head endowed with all proper authority is true only as referred to the secretary, it being fair to presume that the 'non-expert' head would rack indeed with dilemma and confusion. The present head of the 'bureau of ships' has for his most efficient advisers the board on construction. If he freely abides by the majority vote of this board he may feel assured that he has not committed any technical errors, even if he may at times secure thereby a somewhat lesser excellence in results than the very best. The results will always be safe, and the past has shown this to be true. The department could not be better equipped than it is with such a board, consisting as it does of experts in every branch of the naval profession, for it must be remembered that there is no lay member on that board. Ships of war are of such construction that it would not be safe to trust their design to any one man, with the prospect of his carrying out thereon his particular fads or experiments. After the designs are gotten out by the board on construction the safest and best critics are the combatant officers—the men who have to wield these great weapons of war—whose trade is to fight and whose right is to see that the tools given them are fit for their work, that they may do battle with a confidence that their outfit is complete. Whenever plans gotten out by the present or former boards have been submitted to independent naval boards they have met with but slight criticism, thus showing the excellent character of the work put into the designs by the experts in the various departments, and the soundness of a policy which insures a healthful ventilation of all points of doubtful expediency or value. That differences should agitate the board is not only natural, but also highly proper, and is a most effective protection against hasty and regrettable action. This occasional lack of harmony must not be confused with any real lack of efficiency, nor into a cause for recommendations having for their object the reversal of the true business principles by a combination of radically different professional duties. Not only would such a course fail to bring harmony, but a surer result would be in a speedy decline in the rate of progress made in each profession. I, in common with the chiefs of other bureaus, naturally feel a pride in the eminence of the bureau I control, but I am honest in declaring that my opposition to the proposed combination has a reason far above personal feeling or ambition, and that reason is my positive knowledge of the fallacy of the arguments for it and the firm conviction that only confusion, greatly decreased efficiency, and greatly increased expense can possibly result. I can therefore frankly ask that you reconsider the recommendation before renewing it in this year's report."

THE PERSONNEL LAW.

Perhaps the most important feature which the chief-of-engineers touches upon in his report is the workings of the personnel law, which provided for the consolidation of the engineer corps with the line. He finds the workings of the law on the whole very unsatisfactory. In fact his language is at times sensational. After asserting that the present engineering force is insufficient and that in this lies possibly disaster to naval vessels, he says emphatically that fortune alone has prevented casuality. In his opinion the trouble lies not in the scheme itself but in lack of full appreciation on the part of the navy department of the urgency of the need for haste, not only in providing the fullest opportunity for the acquirement of practical engineering knowledge on the part of the younger officers of the former line, but in compelling them by orders to embrace the opportunity to acquire it. Admiral Melville says that there is an immediate and constantly increasing demand for more expert engineer officers with which to protect the interests of the government efficiently. His language is as follows:

"Another year of experience under the provisions of the personnel bill finds the status of steam engineering interests in the navy even less fully protected, and the number and condition of the force for their control even less satisfactory than when I made my last annual report. The magnitude of the work under this bureau has rapidly increased with the additional ships in commission and the new ships building, while there has been a further decrease in the number of skilled officers available for supervising this work and but few signs of speedy replacement. I am fully aware of the futility and folly of decrying legislation simply because the desired results therefrom do not promptly materialize, but surely time enough has now elapsed since the enactment of the reorganization scheme to make criticism of its effects upon the navy both proper and important. To any close observer it is convincingly evident that either the scheme was a mistake, or that the proper course has not been taken to carry out its intent. I am free to acknowledge that the events of the past year have brought only discouragement to those most deeply interested in a successful outcome of this new law, but I am equally candid in the belief that the cause of this discouragement lies not in the scheme itself, but in a lack of full appreciation, on the part of the department, of the urgency of the need for haste, not only in providing the fullest opportunity for the acquirement of practical engineering knowledge on the part of the younger officers of the former line, but in enforcing their embracement of this opportunity in the most effective manner by department orders. It will not do to depend upon unaided individual enthusiasm or details occasioned by the necessities of particular ships. Such a course merely temporizes with the present needs, fails in any rational degree to increase the force of naval engineers (even should it suffice to replace the annual loss), and is hopelessly ineffective to secure the most desirable results in the shape of a speedy acquirement of general knowledge of engineering on the part of the new line as a whole. There is an immediate and constantly increasing demand for more expert engineer officers with which to protect the interests of the government efficiently. This demand can only be met by assigning at once, both ashore and afloat—and in as great numbers as possible consistent with absolutely necessary other duties—the younger line officers as understudies and assistants to the experienced engineers now in charge of engineering work. In no other way can the wished for result be quickly obtained. With a full opportunity provided, I am confident there will be no lack of interest or energetic application on the part of the officers detailed.

"In a number of cases former line officers have had charge of the machinery of vessels during the past year, and while, in some instances, owing to lack of experience, their control has not been marked by all desirable efficiency, in no instance has there been evidenced any carelessness or lack of close attention to the work. On the contrary their devotion to the new duty has clearly been indicated. With steam engineering as a line duty this is pleasing to those who formerly had its entire control, and whose greatest fear might naturally be supposed to be that no efficient engineer officers would succeed them, and that the machinery department of ships would eventually be controlled by men of a more purely practical education (machinist) incapable of maintaining that constant stress toward increased efficiency found so needful to advance or of retaining the proud position of steam engineering of the United States navy at the head of the marine world. In my last annual report I endeavored to express the unsatisfactory conditions clearly, but after the lapse of another year a review of these conditions, with addi-

tional experiences, is necessary. First, there are available over 100 less engineer officers than just prior to the personnel act, and at which former time I had good cause to ask for an increase in the full number then on the list. With this great decrease in numbers came an increase in work, making it a necessity to curtail the usual and needed allowance of engineer officers for ships, until the largest could have but one, and the colliers and smaller ships often none. To the latter were assigned, in most cases, former line officers as heads of the steam engineering department, these depending principally upon the machinists for expert directions. That many casualties have not resulted is not, however, due to the propriety and efficiency of this arrangement, nor does it indicate a safe and commendable condition, for it has only been by dint of the most anxious and continuous care on the part of the depleted force that mishaps and breakdowns have been infrequent. In other words, a state of tension has existed and now exists under which it is neither wise nor safe to continue a day as it is sapping the energy of good men. Instead of building up a personnel for the day of need, stronger than necessary for the time of peace, the engineer officers and men are kept at the point of elastic limit, and a new war today could not fail to develop a large list of physical incapables in the engineering branch the moment the additional burden was put upon them. True, we could call upon the civilian expert for help, and no doubt secure many good men; but how foolish to deliberately lean on this uncertainty when it is possible to school our own intelligent and devoted officers to a degree of satisfactory efficiency. That this schooling will eventually be accomplished I still believe; but my earnest request is for a greater effort to hasten it in order that no day of need will find us sadly wanting. I urge you to decided steps towards this object, pointing again to the fact that, at the present rate, new expert engineers are not being made in any rational proportion whatever to the displacement of the old ones from the active list, if indeed they are being made at all.

"You are fully cognizant of the intricacy and extent of the engineering department of a large ship. That of a smaller one bears the same importance and carries the same danger for the inexperienced. You can, therefore, judge how impossible it is to create in a few months expert engineers irom even the most intelligent officers unused theretofore to machinery. Experience daily under all conditions of service alone perfects efficiency, when combined with intelligence, and it is this experience I ask shall be given now to all line officers possible, below the grade of lieutenant-commander, both at sea and ashore. From the many we are sure to gather a fair proportion particularly adapted to the work and with natural proclivities toward mechanics. These will be the real additions to the engineering branch, and will increase as greater numbers come from the academy. The others, fairly well versed in time, will fill the gaps in emergency of war, and with a universal general interest there will be no need to call for volunteers to man our ships in this department. Regarding the engineering departments of ships at sea in times of peace as well as war, compare for a moment the condition of a battleship depending for the full and proper operations of her motive power upon the knowledge of a single officer, the chief engineer, with that of another ship of the same class whereon any one of the line officers could, in emergency, take efficient charge of the machinery, and several indeed assume and completely fill the position of an expert in that department. The ideal condition of the latter is what we are now striving for, since engineering knowledge has been recognized as of the most vital importance in the service, and it is to the realization of this I still hopefully look, despite the many visible obstacles.

DRIFTING TOWARDS A CERVERA KIND OF FLEET.

"That I should betray unusual anxiety on this question can only be through my intimate knowledge of the conditions now existing and my earnest interest in the welfare of the service. My views, I can properly say, should have more weight upon this point than the views of any other naval officer on board, as these cannot view the situation from as comprehensive a standpoint as can the engineer-in-chief, upon whose shoulders for years has been the special care and protection of naval engineering. Inattention to my recommendations or apathy regarding the immediateness of the necessity for more active and decided measures toward securing the desired conditions can surely result in nothing but rapidly decreasing efficiency, from which it will be continually more difficult to recover, and the cost of which will be significant in enormously larger repair bills, shorter-lived machinery, and a fleet of vessels in doubtful fitness for their designed service—a Cervera fleet, with limitless men, but lacking the technical experts needed to meet the extraordinary and ever-new conditions of emergency and war. I regret I have failed to impress you to the point of action by my former communications. Had a series of calamitous events occurred during the past year to make graphic the insufficiency of the present force of expert engineers, I am sure potent remedial measures would have been promptly taken by the department. But while glad indeed to have disaster averted, I can assure you that danger now exists. It lurks in the silence of seeming security, but a knowledge of its presence should increase the desire to hasten its removal. Fortune alone has postponed casualty.

"The country can safely count on the valor and fidelity of its officers and men, but fidelity and valor without knowledge of the use of the arms given them with which to do battle can avail little against an efficiently drilled foe, and will afford scarcely more than an exhibition of heroic sacrifice, as needless as it would be cruel. The arms of a battleship are her machinery and her guns, 'useless each without the other,' and strong to victory when working well together. No deep thought is necessary to understand this, in the light of late experiences. The very highest degree of excellence in both the condition and handling of each is the price of successful encounter, or at least is the expectation of the country. A ship motionless or helpless to maneuver well could never make efficient battle, be her guns never so good or her crew never so brave. To guard against this the head of the steam engineering department must be full of resource and armed by experience and engineering ability only attained by years of intimate association with machinery under all conditions of service. Haphazard luck may bring a ship through without this, but sane judgment would condemn dependence on simple fortune, or a failure to use every possible effort to insure a most competent management in this most important of ship's departments. Engineering work is as full of interest as it is of importance, and the line may well be proud to preserve the control of it. The most intelligent are eager to become experts, and with their superior advantages need no primary instruction. They do need much experience with and observation of machinery at work and under repair or construction, and it is for the department to decide upon the quickest way by which they can obtain this, and then to afford them the fullest opportunities for doing so. I have already suggested to have incorporated in the regulations the best method for the needed training at sea, i. e., by departmental order to compel all line officers below the navigators of ships to alternate in duty in the engine room and on deck, and efficiency reports to be made quarterly to note their progress and class their ability. My plea is for the highest efficiency; for immediate recognition of its importance as well as of its present decadence through depletion of the number of technical experts without full provision for early replacement. I hold up the warning finger and sound the note of alarm."

The admiral renews his recommendation of last year that a machinery repairing ship be sent to the Asiatic station, giving as his principal reason that the repair work done in the east on American warships has been very unsatisfactory. He recommends that $1,000,000 be appropriated for building such a vessel. His estimates of expenses for 1901-2 amount to $3,785,400.

SHIP BUILDING IN THE UNITED KINGDOM.

From the returns compiled by Lloyd's register of shipping, it appears that, excluding warships, there were 452 vessels of 1,204,008 tons gross under construction in the United Kingdom at the close of the quarter ended Sept. 30, 1900. The particulars of the vessels in question are as follows, similar details being given for the corresponding period in 1899 for the purpose of comparison:

Description. Steam.	Sept. 30. 1900. No.	Sept. 30. 1900. Gross tonnage.	Sept. 30. 1899. No.	Sept. 30. 1899. Gross tonnage.
Steel	398	1,187,264	471	1,331,215
Iron	23	4,363	61	11,060
Wood and Composite	2	785	1	110
Total	423	1,192,412	533	1,342,385
Sail.				
Steel	9	9,280	9	3,620
Iron	...	.....	...	.....
Wood and Composite	20	2,316	16	1,544
Total	29	11,596	25	5,164
Total steam and sail.	452	1,204,008	558	1,347,549

The present return shows a reduction in the tonnage under construction of about 61,000 tons, as compared with the figures for last quarter. As compared with the return for December, 1898, which is the highest on record, there is a reduction of 197,000 tons. Of the vessels under construction in the United Kingdom at the end of September, 379 of 938,595 tons are under the supervision of the surveyors of Lloyd's register with a view to classification by that society. In addition, sixty-three vessels of 221,778 tons are building abroad with a view to classification. The total building at the present time under the supervision of Lloyd's register is, thus, 442 vessels of 1,160,373 tons. Details of this total follow:

	No.	Gross tonnage.
Building in United Kingdom for home account, for sale, etc.	306	722,438
Building in United Kingdom for foreign and colonial account	73	216,157
Building abroad for United Kingdom owners	2	770
Building abroad for foreign account	61	221,008
Total building on Sept. 30 for classification in Lloyd's register	442	1,160,373

The vessels under construction in the United Kingdom are thus apportioned to the countries for which they are being built: United Kingdom, 322 of 909,585 tons; British colonies, twelve of 19,216 tons; Austria-Hungary, seventeen of 57,656 tons; Belgium, one of 460 tons; Brazil, six of 2,400 tons; Denmark, three of 5,935 tons; France, four of 9,920 tons; Germany, twenty of 80,461 tons; Holland, six of 38,675 tons; Japan, four of 1,680 tons; Norway, one of 4,050 tons; Portugal, one of 38 tons; Russia, six of 16,900 tons; Spain, seven of 7,788 tons; United States, two of 3,350 tons; foreign (country not known), one of 600 tons; for sale, thirty-nine of 45,344 tons.

At the royal dock yards there are fifteen warships of 165,840 tons displacement under construction; at private yards there are thirty-eight warships of 198,990 tons displacement under construction, a total of fifty-three warships of 364,830 tons displacement for British account. For foreign account there are sixteen warships of 63,055 tons displacement under construction, making a grand total of sixty-nine warships of 427,885 tons displacement under construction in the United Kingdom at the present time.

Mr. T. F. Newman of the Cleveland & Buffalo Transit Co. is the manager of two passenger steamers, City of Buffalo and City of Erie, which he thinks are fastest side-wheelers on the great lakes. They were built by the Detroit Ship Building Co. But since the Messrs. Parker of Detroit secured from the same builders the steamer Tashmoo, a big river boat, they are disposed to contest Mr. Newman's claim. They say the Tashmoo can outrun either the City of Buffalo or City of Erie in smooth water. Mr. Newman has signified his intention of wagering $1,000 on one of the steamers against the Tashmoo, but asks that the race take place on Lake Erie. In any event the contest could not come off until next spring, and of course there is on both sides an element of free advertising in the controversy, which can be continued all through the winter.

The battleship Kentucky left for China last week and had got as far as quarantine when the 13-inch guns in the superposed turrets were tried. Something was wrong with the mounts of all of them. The battleship put back into New York. Capt. Chester would make no statement.

AROUND THE GREAT LAKES.

It is rumored at Conneaut that an additional car ferry may be put on at the beginning of next season between Conneaut harbor and Canadian ports on the north shore of Lake Erie.

Col. Jared Smith, United States engineer at Cleveland, has asked for bids for removing the wreck of the schooner Dundee, which foundered about 16 miles northwest of Cleveland, a few weeks ago.

Mr. L. C. Hanna of M. A. Hanna & Co., who has been in Europe for some time past seeking improvement in health, has returned to Cleveland and is again giving some attention to business affairs.

On Oct. 12 the characteristic of the light at Whitefish point station on the southerly side of the entrance to the head of St. Mary's river, was changed from flashing white every five seconds to flashing white every ten seconds.

John A. Trefts, a member of the well-known firm of Farrar & Trefts, boiler and engine builders, died at his home in Buffalo, N. Y., on Friday, Oct. 12. He was seventy-seven years old and had long been known as an expert foundryman.

George Y. Wisner of Detroit, formerly of the United States deep waterways commission, will read a paper before the American Society of Engineers at its meeting in New York in November. The society embraces in its membership nearly all of the prominent engineers in the United States and Canada, and it is giving serious consideration to the projects for deep waterways and the canal across New York state.

A notice from the light-house inspector in charge of the Lake Michigan district is to the effect that buoys in Green Bay (gas lighted buoys as well as the ordinary iron buoys) will be removed for the winter about Nov. 8; at Fox island and Rush shoal, Nov. 12; Mackinaw straits (west of Old Mackinaw light station) and channels north and east of the Beaver island group, Nov. 15; off Sheboygan, Nov. 17; off Milwaukee, Nov. 21; off Chicago, Nov. 28.

Barry Bros. of Chicago have sold the passenger and freight steamer Mabel Bradshaw to W. H. Singer of Duluth and will probably also sell the steamer State of Michigan. They want larger and faster vessels for the trade which they are building up on Lake Michigan. The State of Michigan is 177 ft. over all. She carries 500 tons of freight and is allowed 500 passengers. She will sleep 120 passengers and can be made to sleep 200. Her speed is about 11½ miles an hour.

It has just been announced from Buffalo that the Lake Shore & Michigan Southern Railway Co. will build at that place a steel elevator with a capacity of 750,000 bushels of grain, to cost, it is said, $100,000. The contract for its erection was awarded to the MacDonald Engineering Co. of Chicago. The elevator will be situated near the Elk street crossing of the company's tracks. Work will be begun at once, and it will be finished by March 1, 1901. Power from Niagara Falls will be used to run the machinery.

Construction upon the new life saving station at Buffalo harbor will be begun in the near future. The station will be located on the south pier opposite the entrance of Erie basin and will cost between $50,000 and $75,000. The ports of Chicago and Racine on Lake Michigan are also to have new stations. Plans are being prepared at Washington. Superintendent Kimball says the Chicago station will be the equal of any station in the service. Its stone foundation is to cost about $8,000. The site is about a quarter of a mile east of the present station, or in the angle of the south pier and harbor breakwater, bringing out even with the light near that point. Racine's new station will be located between the light-house and the shore in Racine harbor, and will also be a very fine affair when completed.

Mr. H. J. McCarthy has resigned his office as chief steward of the Goodrich Transportation Co., Chicago, and accepted a position in the dining car service on the "Limited to California" with the Santa-Fe Railroad. Mr. McCarthy has been ten years with the Goodrich line and four years as chief steward. His first boats were the Sheboygan and Chicago. Since then he has been steward of every boat in the line, and brought out the new steamer Iowa in 1896. A pleasant affable manner and courteous address made him many friends. His associates have presented him with a beautiful gold locket and guard as a mark of their esteem, and they wish him every success in his new sphere. Mr. C. B. Hamilton leaves the steamer Georgia to assume the duties of chief steward. He has had ample experience to qualify him for the post.

LIGHT-SHIP FOR SOUTHEAST SHOAL.

Officials of the Canadian department of marine and fisheries have certainly done a great deal this season towards aiding lake navigation in the matter of lights, buoys, etc. It is unfortunate that Pelee passage, Lake Erie, has been so poorly lighted. An effort was made to have a crib ready to be sunk a few weeks ago on the middle ground, so as to maintain a light on it for the balance of the fall, but the work was begun so late that an attempt of that kind now would be too risky. But the condition of the passage will not be as bad as was expected. Capt. Geo. P. McKay, chairman of the Lake Carriers' committee on aids to navigation, is in receipt of a letter from Mr. John Hardie, acting deputy minister, saying:

"I beg to advise you that this department is inviting tenders for the maintenance of a light-ship on southeast shoal, from about Nov. 10 next until the close of navigation, and will endeavor to secure a suitable vessel and maintain a light there, at the expense of the Canadian government. This action is taken in consequence of inability to sink the middle ground pier this fall. Col. Anderson was delayed in procuring both iron and wood for the work and very reluctantly advised the department that the risk of sinking it at this late date would be greater than he was prepared to assume."

The light-ship will, of course, be more reliable than a gas buoy and will be kept out later. It is also understood that the department has so located the wreck of the steamer Specular that there will be no difficulty in finding it next spring, when it will probably be blown up. It was thought unnecessary to light the Specular this fall. She lies a good way south of the ordinary course of vessels and will probably not be much of a menace to navigation.

LANGSTON MOORING DEVICE.

The Langston mooring device, which bears the name of the inventor, is designed to afford absolutely secure anchorage for vessels and buoys under extreme conditions of storm, ice pressure or other sources of violent strain. It consists of a cast iron disk of any desired diameter from 10 in. up to 2 ft., on the concave surface of which strong lugs are forged for the holding of triple rings, to which a chain may be attached by a shackle. To sink the device the nozzle of a 1½-in. galvanized pipe is passed through a hole which is bored through the center of the disk. At the upper end of the pipe a hose is attached by means of an inverted U connection (this form being used to prevent cramping), and by this means a stream of water is forced to the under surface of the disk by means of a hydraulic pump. The chain is stopped to the pipe to keep the disk firmly on the nozzle, and the whole apparatus, pipe, hose, chain and disk, is supported from a davit or gaff and, therefore, easily maintained in a vertical position. The disk is lowered to the bottom until it rests upon the sand or other material in which it is to be sunk, when the pump is started. The stream of water, passing through the disk to its under or convex side, loosens the sand and allows the disk with its pipe, chain, etc., to sink into the vertical hole, which is thus continually being washed out as the apparatus descends. The apparatus being supported from a davit in the way described, it is practicable to lower the pipe to the bottom in any depth of water where anchorage may be desired, the pipe merely being long enough to steady the disk in the hole which is bored in the sand or mud of the bottom, and put a disk down from 10 to 30 ft. or more below the bottom. When the disk is at the proper depth, the stoppings of the chain are cast off, by releasing a clutch, and the pipe is withdrawn. The disturbed material immediately settles back on the disk and around the chain, burying it firmly in place. It can be readily seen that the holding power of this form of anchorage is enormously greater than that which can be obtained by means of the plow point of an ordinary fluke anchor or the broad lip of a mushroom anchor, whose hold upon the sand or mud is merely superficial.

In the gale which visited New York on Sept. 5 last, when the wind attained a velocity of 65 miles an hour, striking evidence was afforded of the efficiency of this form of anchor. It seems that eleven of these disks, which have been sunk in the mooring grounds of the Brooklyn yacht club and vicinity, did yeoman service, not merely in holding the particular yachts that were made fast to them, but in saving three or four other boats that had dragged their anchors from being cast ashore. Forty other yachts which were not so secured dragged their anchors of the ordinary type, and were piled up on the beach between Ulmer park and Fort Hamilton.

It was natural that this device should commend itself to the attention of the navy and light-house board. There are along our coast no less than forty-four light vessels and 5,000 channel and coast buoys. The number of buoys that are torn adrift from their moorings every year is such as to warrant the department in investigating every new device that promises to afford a more secure means of anchorage than is at present available. Apart from the financial loss that occurs in the displacement and loss of buoys, which by the way frequently cost several hundred dollars apiece, there is the serious risk to navigation—a much more serious matter. The value of an absolutely secure form of anchorage to the navy is also obvious, for there are many locations where naval vessels can find but poor holding ground for anchors of the ordinary type. Realizing the possibilities of the Langston mooring, the light-house board and the navy department detailed officers to observe and report upon the practical demonstrations of its utility in New York harbor. The last of these tests was made on Sept. 15, at a point a little distance offshore from the Atlantic yacht club house at Norton's point. The experiment was carried out with a 12-inch cast iron disk, which was put down through water 18 ft. deep, to a depth of 8 ft. in a bottom of sand and clay. The time required from the starting of the force pump until the sinking was complete was 6½ minutes. A ⅝-in. crown chain, 15 fathoms in length, was attached to the disk. As the disk descends the sand, etc., closes in somewhat upon the chain and pipe, but upon the withdrawal of the pipe the discharge of the water loosens the surrounding material sufficiently to allow of the easy withdrawal of the pipe, after which the material closes in quickly and solidly above the disk and around the connecting chain.

Sixty minutes were allowed for the filling in of the hole, which, while is was probably not sufficient for the completion of the process and the thorough settlement of the loosened material, sufficed, as the test afterward showed, for all practical purposes. A new 7-in hawser was attached to the chain, and 25 fathoms were paid out and made fast to the towing bits of the ocean-going tug DeWitt C. Ivins, the newest and most powerful vessel of the Moran towing fleet. The tug has a compound engine with cylinders of 15 and 30 in. diameter by 22 in. stroke, and the boiler carries 140 lbs. of steam pressure. The propeller, which is 8 ft. 6 in. in diameter, was turned at 105 revolutions, and this was subsequently increased to 120, a rate which was maintained up to the conclusion of the test, or for a period of twenty-one minutes. The tug failed to produce the slightest effect upon the stability of the buried disk, and it was the unanimous opinion of the officials who witnessed it that the demonstration was completely successful. Although the holding power of the device is so great, the removal of one of these disks is a very simple matter. The hose is brought into requisition, and a double ring, shaped like the figure 8, is fitted tightly to the lower end of the hose and loosely on the mooring chain, down which it slips. As the pipe descends, the stream of water speedily cuts its way through the sand, opening a way for the pipe, until, guided by the chain, it reaches the disk, which may then be drawn up without difficulty.—Scientific American.

"A MANUAL OF NAVAL ARCHITECTURE," by Sir Wm. H. White, director of naval construction in England, is one of the best-known books of its kind in the world. A fifth edition, revised and largely rewritten, is just out. It is a text book for students of naval architecture. Price $9. The Marine Review Publishing Co., Perry-Payne building, Cleveland.

Gardner & Cox of New York have placed with Roach's Ship Yard, Chester, Pa., an order for a steel steam yacht 180 ft. over all. The yacht is to be owned by J. Gardner Cassatt of Philadelphia.

REAR ADMIRAL HICHBORN'S REPORT.

HE REVIEWS EXHAUSTIVELY THE DEVELOPMENT OF THE NAVY DURING HIS CAREER—TRANSITION FROM WOOD TO STEEL—SHEATHING OF SHIPS—NEW DRY DOCKS RECOMMENDED.

The report of the chief of the bureau of construction and repair, navy department, for the fiscal year 1899-1900, which has just been made public, is no exception to the rule which that bureau has established in recent years, of making its report complete, explicit, and therefore of great public value. Especial interest attaches to the current report, as it is the last one submitted by Rear Admiral Hichborn, the present chief constructor, who under the operation of law will retire on March 4 next. The period during which he has held this important post has seen greater changes in the navy than any other equal period in its history, and the chief constructor, about to close an honorable and illustrious career, begun, as he states, "forty-five years ago as a government apprentice employed upon the construction of the Merrimac and Hartford," alludes briefly to the vast transformations which the ship building and allied industries have undergone during his career. He says, after speaking of the old wooden sloops of war, without protection or water-tight subdivision and armed with broadsides of smooth bores:

"How many of those associated with the work of this period, looking into the future, would have believed that during the space represented by the active career of one man, wooden ships of war and sails as a means of propulsion would have passed; that steel should have become the material of construction; steam the one propelling power, and electricity a general agent on shipboard; that the demands for protection, armament, speed and endurance would have forced the construction of battleships and armored cruisers of deep displacements of over 16,000 and 15,000 tons and speeds of 18 and 22 knots? Who of them would have believed that within that time the resources of this country could have been so developed that when such vessels of war are to be constructed every part going into them is American production?"

Passing to a brief mention of the more important matters and measures with the adoption of which the bureau of construction and repair has been identified during Admiral Hichborn's incumbency, brief mention is made of the work of reconstruction of the historic Hartford and the efforts looking to the rehabilitation of the renowned Constitution; the controversy in which the chief constructor prevented useless expenditures of the public money for aluminum torpedo boats after legislative authority for such construction had been especially sought and obtained; his consistent advocacy of sheathing; the inclined turrets, known at one time as the Hichborn turret, the principle of which has been adopted; his efforts in the direction of reduction of wood and the fireproofing of such wood as remained on board ship and the good results accomplished. The encouragement of submarine vessels and the important addition of efficient vessels of this class to the navy which has resulted, are touched upon, as are also the effects of the care and study devoted to conveniences adding to the creature comforts of both officers and enlisted men.

The report opens, as is customary, with the estimates. The principal items are:

For salaries	$ 116,180
For preservation of and repairs to vessels of the navy	7,000,000
For repairs and improvements to navy yard plants	920,000
For civil establishments at the navy yards and stations	25,824
The account of hulls and outfits of vessels and steam machinery heretofore authorized	21,772,917

The chief constructor points out the disadvantages under which the naval station, Cavite, labors, and quotes a report from the naval constructor relative to a proposed site at Olongapo, Subic bay. He withholds recommendation thereon until the question of a permanent naval station in the Philippines is definitely settled. Especial attention is placed upon the need for additional dry docks. On this subject the chief constructor says:

NEED FOR ADDITIONAL DRY DOCKS.

"There are available at the present time on the east coast of the United States but nine government dry docks of all sizes, distributed among seven ports, and of these but one is of sufficient size to take the battleships. The docking facilities available are severely taxed under existing peace conditions. The increase in facilities by the completion of docks already under construction and appropriated for will scarcely keep pace with the growing need for such facilities and the increasing number of ships in service and in reserve. * * * *. This disparity in docking facilities, productive of much inconvenience and some loss in time of peace, would, in time of war, be an extremely serious matter, and might result in keeping a considerable portion of our naval strength ineffective at a critical time. It cannot be too strongly urged that the increase in docking and repair facilities in an adequate ratio to the increase in the fleet, is a necessary element in naval development, and it should be especially emphasized that in this most important matter war requirements and not peace requirements must always be kept in view. Under the present policy only the increasing peace-time requirements are being provided for. In this connection it is worthy of notice that Great Britain has distributed in eight of her home ports alone, fifty-two government docks and locks available for docking purposes, and that France, in five home ports, has thirty-two government dry docks, and that in both countries there are numbers of private dry docks far in excess of those available in this country, which could be employed by the government in time of war."

Some space is devoted to the question of building vessels in the navy yards. He says: "There are at the present time, in view of the prosperous condition of the ship building industry and the number of naval vessels building and appropriated for, sufficient work to permit the assignment of a portion of the building work to the government yards, without there being a question of the withdrawal or withholding of necessary support and assistance, the maintenance of which in a high state of efficiency is unquestionably of national importance."

After pointing out that "the unanimous testimony of experience has been, and is, that the execution of a certain amount of building work in the chief government yards is necessary to the maintenance of such navy yard staffs as a complete and efficient naval organization requires," and that England is building in her navy yards sixteen battleships and cruisers, France seventeen, Germany eight, Russia six, and Italy three, in their government yards, he says: "It is believed that we have reached that stage in naval development, still considerably behind our national development, which forces upon us serious consideration of this step which other naval powers have found necessary and expedient."

The vessels designed by the bureau of construction and repair under the new construction authorized by the last two congresses, are treated of in considerable detail, and the battleships, armored cruisers, and so-called protected cruisers generally described. In connection with this matter, the admiral, commenting upon the battery of battleships, says: "The decision finally come to in the arrangement of the batteries of the new battleships was a compromise between opinions. The merits and demerits of the superposed turret have been under discussion for some years. The completion of the first battleships to which the system has been applied, and the trials to which they have been subjected, have demonstrated only the mechanical practicability of the system of mounting. It has been recognized from the commencement of the discussion that there are grave disadvantages in this system of mounting. * * * * There is nothing in the experience with the two vessels recently completed tending either to show how they may be removed, or to determine the extent of their effect upon the vessels in which this system is employed. The decision in the case of the recent vessels has been reached in practically the same way as the decision relative to the first vessels to which the system was applied, and is based upon the same presentation of arguments, pro and con, although the navy now possesses the means of determining practically, at any rate a portion of, the points at issue."

SHEATHED SHIPS.

As might be expected of an officer so intimately identified with what has been done in this country toward getting sheathed ships for the navy, Admiral Hichborn's report deals at some length with the question of sheathing, and a technical explanation of the principal features involved is followed by these remarks:

"It is a practical impossibility to prevent such fouling that in a short time after docking the speed is sensibly reduced, and after the lapse of a very few months her speed capabilities cut down 25 per cent. to nearly 50 per cent., except by providing her with a wood sheathed and coppered bottom. The process is an old one. Its practicability and freedom from injurious effect upon the ship to which it is applied, even the element of safety which it adds, have been fully demonstrated. Much of the prejudice against it is born of incomplete information as to what is really involved, and is of the same nature as that which opposed the introduction of steam navigation and steel ships."

In speaking of the steel for naval vessels, it is pointed out that nearly 50,000,000 lbs. of steel material has been inspected, passed and shipped during the year, by the inspectors under the bureau of construction and repair, representing an increase of more than 100 per cent. in two years in the quantity of this material required. The vastness of the figures gives some idea of the extent and importance of the operations carried on under the bureau.

ADVANTAGE IN TAKING THE LEAD WITH SUBMARINE BOATS.

Speaking of submarine boats the report states: "The past year has brought to fruition the experimental work covering a considerable period, and has demonstrated the practicability of the submarine boat. * * * * Of the possibilities in the application of efficient submarine vessels to coast defence work it is not necessary to speak; nor is it necessary to do more than mention the economy in men and money in this form of defensive preparation and the moral effect upon an enemy which will come from a knowledge that we possess and are employing for coast and harbor defence, vessels of so great possibilities. * * * * Experience has shown that the appearance of any particular type of fighting craft in sufficient numbers to make its possibilities a factor to be considered, forces modifications in types previously existing. That this should be particularly the case with submarine vessels, there is every reason to believe, and there can be little doubt that to the first nations in the field with the new type will accrue not only the advantages which will come from the possession of efficient vessels of this type, but the additional advantage and saving in cost that will result from an early understanding of the new type and the modifications which its introduction will force in existing types."

Embodied in the report are tables showing the vessels completed during the past fiscal year, as well as those dropped from the navy list, and a separate table gives for all the vessels under construction, the percentage of completion on July 1, and their probable dates of completion. Copious extracts from the reports of the naval constructors at the several navy yards, and from the reports of the superintending constructors, give detailed information as to the execution of the mechanical work under the bureau. At the end of the report there are very complete and elaborate tables, giving information of great value relative to vessels, built and building.

FERRY TO BLAME.

Judge Swan of the United States district court, Detroit, has rendered a decision in the Lansdowne-W. B. Morley collision case, in which he holds the Lansdowne solely to blame for the collision, because of the improper arrangement of lights on that steamer. The Lansdowne is a ferry used by the Grand Trunk railway in transporting its trains across the river at Detroit. The collision occurred early on the morning of Aug. 6, 1899. The Morley was upbound with a cargo of coal and the Lansdowne had just left her slip at Detroit. The Morley sank immediately after the crash and the ferry went to the bottom while on the way to the ship yard. The case has been bitterly contested by the railroad people, and they caused a counter suit to be filed against the Morley. In the case just decided the owners of the Morley asked for damages amounting to $45,556 and the expense will be equally divided between the Wabash and Grand Trunk railways, owners of the Lansdowne.

The Cherbourg Chamber of Commerce has voted 120,000 francs for the construction of three landing-stages rendered necessary by the extension of the transatlantic traffic connected with that port.

MICHIPICOTEN IRON MINES.

FRANCIS H. CLERGUE OF SAULT WATER POWER FAME IS NOT SPARING MONEY IN THEIR DEVELOPMENT—CLAIMED THAT 500,000 TONS WILL BE STOCKED AT ONE PROPERTY IN THE WILDERNESS ABOVE THE SAULT DURING THE WINTER.

The News of Sault Ste. Marie, Mich., furnishes the following account of the recent development of mineral and timber lands at Michipicoten on the north shore of Lake Superior, just above the Sault, since Francis H. Clergue of Sault water power fame began operations in that part of northern Canada a short time ago. Allowance must be made, of course, for the enthusiasm that prevails in the towns on both sides of the Sault river falls (Canada and the United States) on account of the millions of dollars which Mr. Clergue is spending in the construction of power canals. The News says:

Less than a year ago a howling wilderness, with an Indian wigwam or two; today a busy little town of 800 inhabitants, and many modern conveniences. This in brief is the metamorphosis that has been worked at Michipicoten in that comparatively short time by the energy and genius of American brains and capital in pursuit of an enterprise yet in its smallest swaddling clothes, an enterprise that is destined to develop into gigantic proportions within the next few years, in the natural course of events. It means the ultimate development of the vast natural mineral and forestry interests of Northwestern Ontario, as well as the unexplored expanse of virgin territory north of that and extending to Hudson Bay.

The new Michipicoten, as it should be termed to distinguish it from the old Indian settlement about three miles distant at the mouth of the Michipicoten river, is situated in the land-locked harbor behind Gros Cap, at the extreme western end of Michipicoten bay. It is about 125 miles from Sault Ste. Marie, on the rugged north shore of Lake Superior, and is now reached by a steamboat run of from ten to twelve hours. Later, and in all probability next year, there will be railroad connections. But of that, more anon. The harbor is an extensive one, commodious enough to accommodate the entire lake fleet to a safe anchorage. It is a pretty spot, surrounded by towering hills and mountains covered with forests. The new village of Michipicoten nestles at the foot of the mountains, and here will be situated one of the brightest gems in the diadem of Canadian cities at no distant day. It will be the entrepot for the extensive mineral and other products of the vast country tributary to it, which has already given substantial indications of its mineral wealth, to say nothing of its valuable forests which are in evidence on every hand. It has already no inconsiderable start, for it is one of the terminals of the Algoma Central Railway and the shipping point for the Algoma Central steamship line, now plying between that place and the lower lake region. On arriving at the harbor, these things are seen: An iron ore dock, 500 ft. long, jutting out into the water, with twelve chutes and twelve pockets; to the east of it about 400 ft. a big commercial or merchandise dock, with commodious warehouse and a standard gauge railway track laid to its end; freight sheds and railway offices; puffing engines, pulling trainloads of iron ore to the dock, or taking out merchandise to the Helen mine; a fine hotel faced by a broad veranda, a well equipped store, a hospital, new dwellings, and other indications of a rapid and recent growth. Already the villa boasts of a telephone and telegraph service, but not as yet to the outside world. That will come later. Within a short time an electric plant will be in operation for lighting and other purposes, and a system of waterworks and sewers will be installed. And all of this at a place as wild and isolated a year ago as can well be imagined.

If anyone in this section of the country had made the declaration soberly in 1898 that two years later would see a railroad in operation at Michipicoten, one of the largest iron mines in America in operation there, and shipments of ore being made, he would at once have been set down as a harmless lunatic, so utterly improbable would it have seemed. Readers of the News all remember the announcement of the gold discoveries in 1897-8, that first directed the attention of the public to that locality, and caused an influx of thousands of prospectors. It was gold they were after, but in the prospecting other minerals were found, and it is due to the discovery of the humbler mineral, iron, that the first large development was undertaken. Ben Boyer, an old prospector of the Canadian "Soo," found a deposit twelve miles north of the harbor, but of its extent he and everyone else were ignorant. He staked his claim, and then tried to sell it, offering it at various prices from $200 to $500, but could find no buyer. At last he attracted the interest of F. H. Clergue, at the head of the water power development in the twin "Soos," and allied industries. Mr. Clergue purchased the property for $500. The ore was found to be a fine quality of brown hematite running from 60 to 65 per cent. in metallic iron. Exploitation developed that there was a vast body of it, a veritable mountain of iron, reaching down into the earth hundreds of feet. The property was thoroughly tested and adjoining claims purchased. It was found to be all that it originally promised, and more. One of the principal industries projected at the Canadian "Soo" was the reduction of iron ore by electrolysis. Here, right at hand, promising easy development, a short freight haul and cheap water transportation, was the needed natural commodity. It was manifestly a big thing, and the possibilities in connection with it were quickly seen by Mr. Clergue. The rest was easy to a man of Mr. Clergue's genius and rare grasp of gigantic business enterprises. Then came the building of the first branch of the Algoma Central Railway, from the shores of Michipicoten, to the iron ore location, about twelve miles distant.

BUILDING THE RAILWAY.

In building the line to the Helen mine, engineering difficulties existed such as are encountered in all mountainous countries, with the further disadvantage of being miles away from a base of supplies. Everything had to be shipped in by water. En route to the mines are a succession of granite hills and mountains, deep valleys, lakes and streams. The country is rugged in the extreme. Under these circumstances it is easily perceivable that it was no mean engineering feat to build the road. There were heavy grades to overcome, many rock cuts to blast and bridges, culverts and trestles to construct. That this was all accomplished within a year, and in a substantial and permanent manner, falls little short of the wonderful. A trifle over a year from the time the work was begun, shipments of iron ore were being made to the shore, thence to the lower lakes. There is a rise of about 650 ft. from the lake shore to the mine, and the railway has a continuous up grade with the exception of a short distance at the northerly end. This makes easy work for the engines in hauling the iron ore from the mine. There is probably no better constructed railway in the country. The roadbed is remarkably smooth, and is ballasted with gravel. It is laid with 85-lb. steel rails. That means that each single rail weighs 850 pounds, or nearly a half ton. The equipment for the road is the best that money can procure. Two new engines recently received from the Baldwin Locomotive Works, each weigh 140 tons and are the largest made except for special work. They are monsters and belong to the class used for heavy traffic on the western railroads. The ore cars are of pressed steel and have a capacity of 50 tons each. The flat cars have a capacity of 40 and 50 tons. Then there are passenger coaches and freight cars, all of modern design. There is nothing but to wonder at and praise concerning the equipment of the road.

The railroad yards are situated a mile north of Michipicoten proper. Here is located the machine shops and other auxiliaries of a railroad terminal. Place for a big coal dump is being cleared. A fine round house is being built of brick, and will be completed this fall. It will have five stalls. Dwellings are being erected for employes, both at this point and at the harbor proper, that will be supplied with all modern conveniences, electric light, water, baths, etc. The rentals will be nominal, and tenants will be given an opportunity to buy the buildings and property on easy terms. Everywhere is seen evidences of a broad-gauged policy on the part of the company.

It is a ride of nearly an hour from the harbor to the Helen mine, including five stops en route, and a pleasant ride it is. The scenery is picturesque in the extreme and a delight to lovers of nature in her most rugged mood. The road traverses a natural pass in the mountains, and has many abrupt curves. In places it winds around mountains whose tops cannot be seen from the coach window, while on the opposite side one can look down hundreds of feet. Again it creeps over high trestles bridging water courses through the gullies. At the Magpie river, a steel bridge is being built. The entire route is a panorama of mountain, valley, lake and stream, the scenery being appalling at places in its grandeur. On approaching the Helen mine, the road passes over a sharply curved trestle a hundred feet above the level of a lake whose shores are directly beneath. Then the famous mine is sighted, and soon the train stops at the base of the mountain which is a part of the mine.

A MOUNTAIN OF IRON ORE.

A pen picture of the mine cannot convey an adequate impression to the reader. From the lake at its foot, the iron mountain rises gradually to a height of about 200 ft., thence more abruptly 150 ft. higher. The mining operations are being conducted at the base of the mountain. Here the surface has been stripped, leaving a vast body of the reddish ore exposed. There is sufficient of the ore practically in sight to last for many years. At one point midway up the mountain, a test tunnel was run in a distance of 240 ft. through solid ore. A quarter of a mile on the other side of the mountain a drill was sunk also through ore. At the foot of the mountain diamond drill tests gave the same result at a depth of 300 ft. It is a veritable mountain of ore containing what may be said an inexhaustible quantity, variously estimated at from 50,000,000 to 75,000,000 tons—perhaps more. There is said to be about 2,000,000 tons exposed where the mining is going on.

Powell & Mitchell, of Marquette, Mich., have the contract for getting out the ore, and have a plant on the ground that has already cost upwards of $100,000. This includes buildings and mining equipment. A Gates ore crusher is located on a bluff near the mine and above the railway track. An aerial conveyor carries buckets on a cable from the working part of the mine, to the crusher. The buckets have a capacity of five tons of ore and are dumped automatically. The crusher can take care of 4,000 tons daily. From the crusher the ore is shot down into the steel cars, ready for transportation. In all at the present time Powell & Mitchell have 350 miners at work, on day and night shifts. The plant is electric lighted. It is all surface mining. A few power drills are in operation, but the major part of the drilling is being done by hand. The method of mining is simple. The ore is blasted out of the mountain side, broken up with sledges, placed in the conveyor buckets, and thence carried by power on the cable to the crusher. About 1,000 tons of ore are now being gotten out daily for shipment. This winter's product will be placed in a stock pile that will be located about six miles down the railway. It is expected that 500,000 tons at a minimum will be mined this winter. Powell & Mitchell are adding to their mining force every day, but are experiencing difficulty in getting men. The lowest wage paid is $1.75 per day, and board is $3.50 per week. The men are well treated, the work is not hard, and they are well-fed and housed. Commodious quarters for the miners are being built. The contractors have already in operation their mammoth culinary and dining building, the main part of which is 40x200 ft. in dimensions. There are accommodations for 690 people at a single sitting. The culinary department is located in the middle section and is presided over by Steward Thos. Connelly and a force of twenty-five assistants. Everything is cooked by steam that can be, the most modern apparatus being installed. Mr. Connelly informed the News representative that he had recently completed the herculean task of making out a list of groceries and food products for the winter's supply, amounting to $80,000.

In connection with the enterprises at Michipicoten, the Algoma Central steamship line was organized. Last year the steamer Minnie M. was purchased and placed on the route, making regular trips between the "Soo" and Michipicoten, carrying passengers and freight. Then it became necessary to secure ore carriers. Owing to the unusual demand for carriers, Mr. Clergue found it impossible to secure any upon reasonable terms on the lakes. Agents were sent to Europe, and purchased four steel steamers. Two of them, the Paliki and Theano, were built for the Greek ore trade, and the others, the Leafield and Monkshaven, for the Spanish ore trade. They have a carrying capacity of 2,500 tons each. They were there in readiness to carry ore in the early summer. The first shipment was made from Michipicoten in July, the ore being taken to Midland, Ont., where a Canadian company erected a large furnace to take care of the ore. In all about 40,000 tons of ore have been shipped there this season. On the closing of navigation the four steamers will be sent to salt water for the winter months. Next year will see the carrying fleet augmented by four steamers, of larger capacity than the

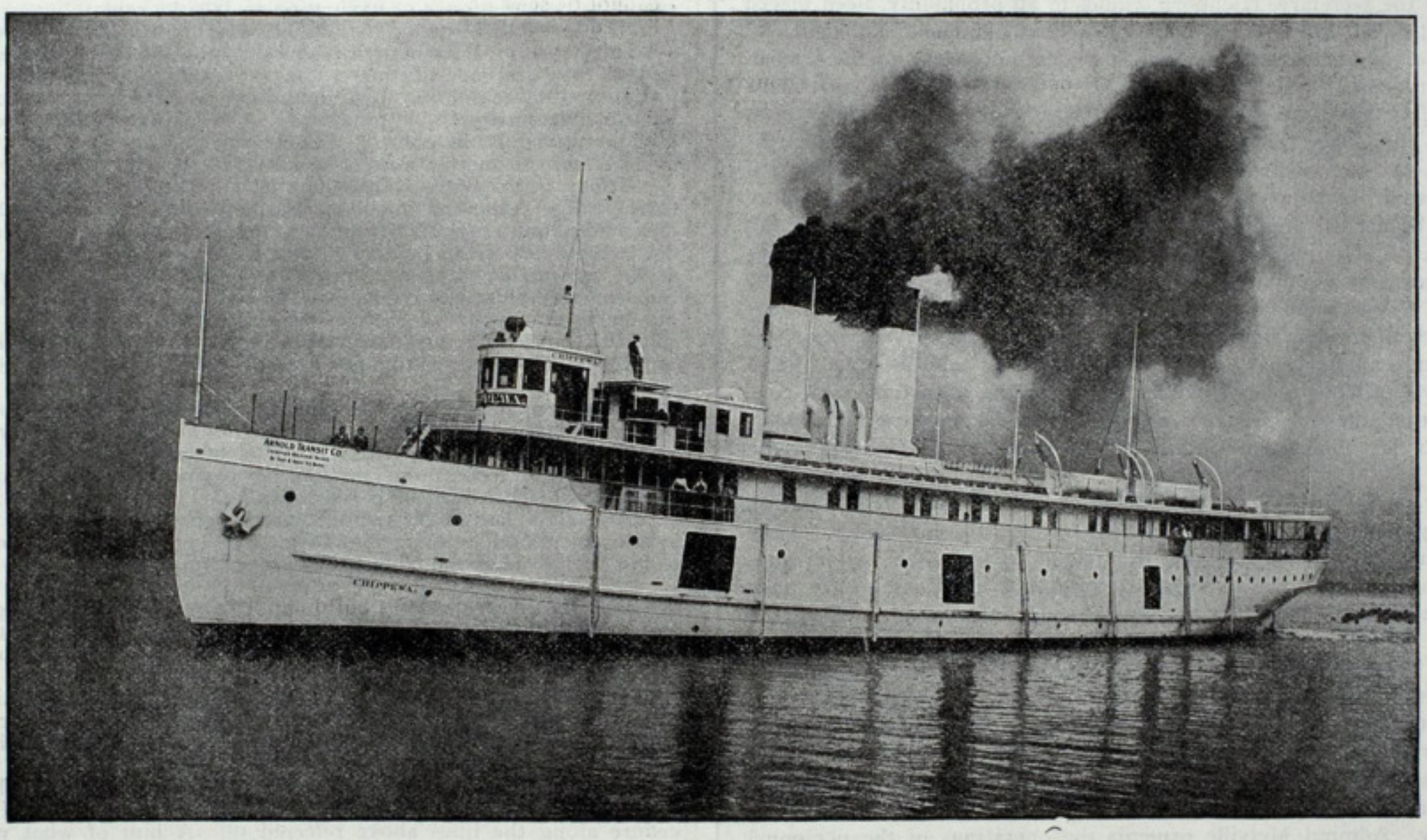
crafts purchased this year, which are now building in England, and by eight tow barges of 3,000 tons capacity each.

H. E. Talbot, of Dayton, O., who laid out the route of the railway from Michipicoten to the Helen mine, and who was the engineer in charge of the construction work, has the contract for building the double-track steel railway bridge across the Magpie river and has a force of about 100 men at work there. Mr. Talbot also has the contract for the erection of the round-house at Michipicoten, as well as for other work in that vicinity.

The Algoma company has another iron property 12 miles from the Helen mine. It is known as the Josephine and it is expected to turn out fully as valuable as the Helen. The lines for the extension of the railway to the new property have been run, and in all probability work of construction will begin this fall. There are three other mines in addition to the Helen and Josephine that are owned by this company. They are the Jackfish, 18 miles from the Helen, the Magpie, 24 miles distant, and the Dog River, 36 miles away. They are all promising properties. A big force of prospectors is kept constantly in the field, and other valuable discoveries have been made about which Mr. Clergue is saying nothing as yet. One of these in particular is a gold proposition, better than anything found in the district. A winter road is being opened to Grassett, on the Canadian Pacific Railway, and a force of men is engaged in building a telephone line to that place. It will be in operation this winter.

FAST EXCURSION STEAMER CHIPPEWA.

One of the neatest and fastest of the small passenger steamers on the great lakes is the Chippewa, which has just finished her first season on the route between Cheboygan, Mackinaw island and Sault Ste. Marie, Mich., through the picturesque Sault river. The Chippewa, owned by the Arnold Transportation Co. of Mackinaw, Mich., is easily an 18-mile-an-hour boat. She was guaranteed by her builders, the Craig Ship Building Co. of Toledo, O., to maintain that speed for five hours and has more than equalled expectations of both owners and builders. The Craig company has reason to feel proud of this vessel, as she has been an object of special interest throughout the season, not only to the high class of tourists who patronize the Mackinaw and Sault river districts, but also to vessel men and ship builders who know how to appreciate a well-designed passenger vessel.



EXPRESS PASSENGER STEAMER CHIPPEWA—OPERATING BETWEEN MACKINAW AND SAULT STE. MARIE, MICH.

The Chippewa is 206 ft. over all, 34 ft. beam, 21 ft. 6 in. molded depth and 8 ft. 6 in. between deck. She is of mild steel throughout, including the main deck; was built to comply with the requirements of the Bureau Veritas, and was inspected during construction and classed by Capt. Herriman, surveyor general for that register. The steamer is built on what is known as the bar-keel system, the center keelson forming the keel, with garboard plates flanged to the same. The center keelson is 32 in. by 15 lbs. from stem to stern-post; center keelson plate 18 in. by 15 lbs., connected to center keelson by 3x3 in. x 6 lb. angles. Floors of frame are made of 12½ lb. plate, except under engine and boilers, where the plates are 16 lbs., all connected to center keelson by double 3½x3½ in. by 6 lb. angles. The steamer's frame is 3x5 in. by 12 lb. angles, 24 in. to centers; reverse frame is 3x3 in. by 6 lb. angles. There are three stringers in the main hold, equally distant from keel to main deck beams, these stringers being composed of two 3x4 in. by 8 lb. angles to each stringer. Between these angles to each stringer is a 10 lb. intercostal plate, between the frames, and connected to shell plating by intercostal plates, being flanged against the shell plating, thus making the side of the structure very rigid. The main deck beams are of 8 in. channels, connected to frame by 12½ lb. gusset plates. Main deck stringer is 30 in. by 16 lb. plate; main deck 10 lb. plate; upper deck beams 3x5-in. angles, spaced to 48-in. centers, and upper deck of wood, covered with canvas. The garboard plate is 17½ lb., the sheer strakes 17½ lb., and the balance of plating from main sheer strake to garboard 16 lb., so as to make the steamer look smooth. All the butts were strapped inside—not lapped, as is the common practice. The plating from main deck to upper deck is of 10 lb. plate. The stem and stern-post are of wrought-iron, forged.

Propelling machinery consists of a triple expansion engine, with cylinders of 20, 32½ and 55 in. by 30 in. stroke, also designed and built by the Craig company. The cylinders are covered with asbestos 3 in. thick, and lagged with ⅛-in. steel. The high pressure and intermediate cylinders have piston valves and the low pressure cylinder has slide valves, all actuated by Stevenson's link motion. Each valve has its own cut-off, actuated by screw in the arm of reversing shaft. All valves are operated by steam reversing gear. All journals, except crosshead journals, are made with steel sleeves, and filled with Merchant & Co.'s genuine hard babbitt. Cross-head pins have brass journals, the main shafting being of iron, forged, with couplings forged on. The driving shafts also have driving collars forged solid onto shaft; driving bearing of the horseshoe type, all 11 in. in diameter. Crank pins are 14 in. long in the bearing, 11 in. in diameter, and are made of acid open-hearth steel. The propeller wheel is 10 ft. in diameter and 16 ft. lead. The air pump is of the vertical compound type, with steam cylinders 10 and 18 in. x 16 in. The feed pumps and bilge pumps are of the admiralty type. With the engine making 135 to 140 revolutions, a vacuum of 25 in. was maintained, with the air pump making 28 strokes per minute, giving the very best of satisfaction. This engine was made to work to a maximum capacity of 150 revolutions per minute, with 225 lbs. boiler pressure.

The Chippewa has four boilers of the Roberts type, built by the Roberts Safety Water Tube Boiler Co. of 39-41 Cortlandt street, New York. They are set in pairs, each pair having its own smokestack. Two are forward of the boiler room and two aft. They are each 9 ft. long by 9 ft. wide. Their collective grate surface is 212 sq. ft.; collective heating surface about 6,700 sq. ft. The engines developed over 1,000 H. P. with only two of the boilers in use. The weight of the four boilers including contained water at steaming level, and everything except smokestacks and breechings, is about 41½ tons.

The main cabin is situated on the spar deck. It is of mahogany throughout and contains twenty-four staterooms. The captain's, mate's and quartermaster's rooms are on the hurricane deck, as is also the large smoking room just forward of smokestack. The dining room is on the main deck, aft of after gangway, and connected to the main cabin by a social hall on the main deck opening to stairway to cabin above. The social hall and stairway are finished in mahogany, similar to the cabin above. The dining room, aft of social hall, is finished in China white and gold, and will accommodate eighty people at one sitting. The galley and crews' quarters are directly under dining room. The steamer is thoroughly ventilated with McCreary's ventilating system. She is lighted by 225 16-candle-power lights, and has also signal lights, as well as a 5,000-candle-power search light on top of pilot-house for running the "Soo" river by night. Steering gear is of the Williamson Bros. make—combination hand and steam.

Mr. A. P. Moorehouse, manager of the Cunard Steamship Co., is enroute to this country from Liverpool. It is understood that his visit to the United States is in connection with the decline of the British transatlantic trade as compared with the German lines. There is a report in England that the Cunard people contemplate great development in the way of building new ships.

The Pacific Steam Navigation Co. has sold the fine new steamship Potosi, a twin-screw vessel of 4,700 tons, just launched by Wigham, Richardson & Co., to the Russian government for $625,000. The vessel will be used in the volunteer fleet as a transport and she is being fitted up to accommodate 2,000 men, with officers. The Potosi is a 15-knot ship.

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Both the chief constructor and the engineer-in-chief of the navy have filed their annual reports with the secretary of the navy. Both are interesting and capable documents. Each dwells at length upon points in which they are especially interested. In an indirect and fine Italian way each pays his respects to the other. Hichborn is an advocate of sheathing of ships and Melville is not. To those who know both of these excellent gentlemen it seems quite clear that Hichborn was thinking of Melville when he wrote: "Much of the prejudice against it (sheathing) is born of incomplete information as to what is really involved and is of the same nature as that which opposed the introduction of steam navigation and steel ships." Hichborn has also been an advocate of the consolidation of the bureaus of construction, engineering and equipment under one head, and, indeed, had the consolidation been effected when it was recommended by the secretary, Hichborn would, in all probability, been placed at the head of it. Melville has been a vigorous opponent of the plan of consolidation since its inception; and it seems quite clear to the layman that he is thinking of Hichborn when he says: "If a naval constructor should be found to pose as an expert engineer it would necessarily mean one of two things—either that he has neglected to a most serious extent the pursuit of his own profession, or that his own profession possessed but little requiring absorbing study and great experience, and therefore gave him the needed time for the study and pursuit of engineering. On the other hand, if an engineer should pose as the expert head of the combination I am sure a similar statement would be made by the constructors, or at least, I am confident that they would scarcely acquiesce in a supposition that their work is in any degree less absorbing, or requiring less devotion and experience. Of course if it should be acknowledged that a minor degree of labor is necessary for acquiring the science of naval construction, then the one selected would have to be an expert engineer, owing to the less difficulty of adding a small portion of knowledge to the larger."

Both reports, however, are valuable contributions to the literature of the navy department. These two men have vastly enriched the navy of the United States, and it would be difficult to find their betters anywhere. Together they evolve formidable fighting machines. They have not only kept pace, but they have practically been in advance of the progress of naval construction and marine engineering. The naval revolution has occurred within their lifetime and they are a part of it; indeed, it is a part, too, of their own evolution. Notwithstanding their prejudices they are giants, both of them. The report of Admiral Hichborn is particularly interesting in that it reviews the development of the navy during his active connection with it, which embraces both the Merrimac and the Oregon. It is, in its way, a history of the United States navy. Admiral Melville presents the operations of the personnel law in language so virile that it cannot fail to arrest the attention of the whole country. From what he says it is time to sound the note of alarm.

Let the subject be one of a commercial kind and the daily press is certain to deal out arrant nonsense. Was there ever such rubbish written as this which appears in the columns of the Philadelphia North American?: "The armor plate people have had their opportunity and have lost it. There is no longer any excuse for showing them further consideration. If they had acted in a spirit of fairness they might be entitled to respectful treatment, but their whole policy has been one of threatening arrogance and narrow greed. It is time for Secretary Long to shut the door of his office in their faces. Congress has given Secretary Long power and money to build a government plant. He has already lost four months by waiting on the pleasure of the trust. He now proposes to advertise for bids to construct the battleships and cruisers authorized by congress, but no contracts can be awarded until the armor question is settled. His duty is plain. He should refuse to yield to the trust and should use his authority to bring the erection of a government factory."

In the first place the bids which were submitted by the makers of armor plate were lower than the price which obtains in any other country; and considerably lower than what the same makers are now charging European countries for armor plate. It was simply the unfortunate division of work which prevented the acceptance of the bids—a condition which could not have been foreseen before they were opened. The making of armor plate is a virtual monopoly from its very nature. It is not an independent business. No business man would put money into a plant for the making of armor plate alone. There is not a sufficient demand for the product. It is not a commodity which can be kept in stock. Every bit of armor plate is a special order. As a commercial proposition an armor plate factory can only be successfully operated as an adjunct to an already complete steel making concern. Even then the venture is one of considerable risk, for the initial capital required is immense, the machinery of the heaviest and most expensive character, and there is no guarantee, whatever, but what new processes and new discoveries will render the plant obsolete before a ton of armor can be turned out. To establish an armor plate factory for the purpose of saving money is absolutely ridiculous. Omitting the initial cost of the plant, which in itself would defeat the object sought, by what alchemy does the government hope to make armor cheaper than concerns that have devoted years to a study of economy in its manufacture? Should the government start tomorrow to erect an armor plate factory it could not turn out a ton of armor in less than four years—and that first ton would cost $4,000,000 to make. There is a government armor plate factory in Russia which is so imminently successful that Russia obtains her armor from England and the United States.

Alexander R. Smith has an article in the current issue of Gunton's magazine in which he punctures thoroughly an article published in the same magazine a few months ago upon the subject of "Sound Shipping Protection," by Capt. William W. Bates. Capt. Bates' article is devoted to a condemnation of the shipping bill in general. Mr. Smith takes Capt. Bates to task in copious extracts from Capt. Bates' writings and utterances while commissioner of navigation. Fifteen years ago there was no more earnest advocate of a shipping bill than Capt. Bates himself. His report upon the rise and decline of American shipping is a standard one and occupied two days in its reading in the house of representatives. At that time he strenuously advocated subsidies and bounties. In his report as commissioner of navigation in 1890 he said:

"The way to begin this work (of reviving American shipping) is by a bounty system; a system that will act immediately and efficaciously; a system that will specially increase our exports as differential duties cannot do and never did do. Differential duties will give us the import trade but not necessarily the export trade to the same extent. Bounties will give us ultimately the control of both trades. For the present all in favor of an American marine must vote for bounties."

Today Capt. Bates thinks that it will require hundreds of millions to revive the American merchant marine. Ten years ago he figured that it would require $8,200,000 per annum. The tonnage bill as originally drafted and advocated by Capt. Bates fixed upon 30 cents per 1,000 miles as the amount of compensation for American ships in the foreign trade. Subsequently this was reduced to 20 cents per 1,000 miles sailed. The bill he is now opposed to fixes upon 10 cents per ton per 1,000 miles sailed except for the first 1,500 miles outward and inward, where the rate is fixed at 15 cents per ton per 1,000 miles sailed. In 1890 Capt. Bates said:

"The tonnage bill had two faults induced by a desire of the committee on marine to be as saving as possible of bounty money. The first was starting the scale of bounties at 20 cents a ton, instead of 25 cents, at least; and the second was in limiting payment of bounty on a single voyage to 7,000 instead of 10,000 miles."

And thus has an erstwhile commissioner of navigation practically swallowed himself. Mr. Smith reviews the present bill and predicts that it will be passed at the coming session of congress.

Has the government of the United States the power to grant privileges that will interfere with navigation? This is a broad question, a new question of widespread interest that may soon be submitted to the highest courts of the land by the Lake Carriers' Association. It is not probable that the officers of that organization will submit passively to the disadvantages to shipping that have been encountered at Chicago on account of complications growing out of the opening of the drainage canal. The drainage canal authorities, resting upon their claim of a grant from the war department, to take water from Lake Michigan through the Chicago river, may shortly be confronted by a new form of legal procedure along the lines above referred to. A hint of what may be expected on this score is very probably contained in the dispatch of a few days ago from Chicago stating that Capt. J. G. Keith, vice-president of the Lake Carriers' Association, had presented a bill of $1,400 to the sanitary trustees, alleging the sum to be the loss sustained by having the steamer S. S. Curry "hung up" at the Terminal railroad bridge. President Boldenweck of the drainage canal trustees refused to pay the amount. The Curry became jammed in the draw of the bridge Sept. 17 and remained imprisoned eighteen hours, causing one of the worst blockades of the year. Thirty ships were detained, and a fleet of incoming lumber "hookers" caused a jam in the south branch that lasted twenty-four hours after the Curry was pulled out of the draw. Passengers on the Wisconsin Central Railroad had to be carried past the obstruction in 'buses.

It would seem that there should be some limit to the degree of untruthfulness to which the partisan newspapers descend in the heat of a national political campaign such as that now under way. The Buffalo News a few days ago contained a full column of falsehoods relative to the food furnished to men aboard vessels of the firm of M. A. Hanna & Co. It was charged that the cost of feeding the men was not equal to what is paid for prison or poor-house fare in Buffalo and that there was no line of vessels on the lakes so poorly provisioned as the Hanna vessels. All this because Senator Hanna happens to be chairman of the Republican national committee. Politics find no place in these columns, and it is unnecessary to refer to the Buffalo News article as far as vessel men are concerned, but the general public has no positive knowledge of such matters and is unfortunately too often disposed to place some reliance in newspaper statements. The newspaper profession is disgraced by the publication of such a mass of lies regarding a reputable business concern. From one end of the lakes to the other there is no business house more highly respected or more liberal in its dealings with employes than M. A. Hanna & Co. Provision bills on its vessels are probably equal to the highest that are paid on the lakes, and there are many ships that provide to captain and deck-hand alike more variety in food than is to be found in the homes of most of the owners.

CRUISE OF THE BUFFALO.

The auxiliary cruiser Buffalo, originally the Morgan liner El Cid and later the Brazilian dynamite cruiser Nictheroy, arrived in New York on Saturday last from Gibraltar after a cruise, chiefly in the Pacific, covering all told 30,174 knots in exactly six months. She sailed from Norfolk on April 20 with 438 ambitious young Americans, mostly from the west, and she left every mother's son of them with our fleet in Chinese and Philippine waters. Sixty of the young tars were recruited in New York and ninety in Philadelphia. All the rest were from the district bordering the great lakes. They were a vigorous lot and only a few of them had been aboard a ship of any sort. They were derisively referred to by their shipmates who formed the working company of the Buffalo as "farmers." There was only one of the lot who was seriously sick on the voyage to the Orient. He is still under the weather, and came home on the Buffalo. The first stop of the Buffalo after leaving Norfolk was Fayal, in the Azores. She was there six days, and her men had practically all the shore liberty they wanted. This is in pursuance of the idea that the only way you can touch the heart of the Yankee sailorman to make him like his job is to treat him with liberality. The next stop of the training ship was Gibraltar. Thence she sailed to Gravesend and to Southampton. All hands had expected to have a merry cruise of six months and come out of it rated at least as ordinary seamen. But Commander C. T. Hutchins got word at Southampton to proceed with all haste to China and put his young landsmen aboard ships of the Asiatic squadron that needed them. That was the first news that the Commander got of the scrap in China. Thereafter there was no shore liberty for anybody. The young fellows thought that they were going to have a chance to take part in real war, and there was not a soul of them who did not rejoice in the prospect.

Before leaving Gibraltar the Buffalo put aboard the English-built cruiser Albany, which had been ordered to the east, eighty of the recruits. After leaving Gibraltar the cruiser averaged 12 knots, and at times, with a daily expenditure of only sixty tons of coal, she made her limit of 15 knots, despite the foulness of her bottom. When she left Norfolk she had a fine band, made up mostly of Americans. When she got to China the Brooklyn and the Newark demanded the musicians and got them. Inasmuch as the Buffalo had concerts every day, the officers and men felt rather lonesome without hearing the "Star Spangled Banner" occasionally. At Hong Kong 110 landsmen were put aboard the Monterey. The rest of the youngsters were, as Lt. Com. Hosley expressed it, "peddled" out among the various ships of the fleet, including the Brooklyn, Nashville, Helena, Marietta, Yorktown, Yosemite and Celtic. About a quarter of them had acquired the rating of ordinary seamen. Forty expressed preference for the grimy job of coal passer. There were some who had had experience as carpenters, painters and coppersmiths, and when they were turned over to the ships of the Asiatic squadron they were rated accordingly. Not one of the officers was "shanghaied" for service in China. Most of them were rather glad that they were able to come back. A few would have liked to have more active duty than cruising with landsmen.

When the Brooklyn and Newark took the band of the Buffalo they left the bandmaster behind. He asked permission to recruit a band on the way home. With the help of the American consul at Malta he got a lot of Maltese, partly of English and partly of Italian descent, and they made music every day for the rest of the cruise. They had a hard time with the national airs at first, but they play them now as if they had been brought up on them. The Buffalo has a large number of monkeys, parrots and queer birds picked up by her crew in the many ports at which she touched. This is the list of her officers: Commander, C. T. Hutchins; Lt. Com., H. H. Hosley; Lt. Com., H. O. Dunn; Lieuts., Eaton, Dieffenbach, Long, Stone and Butler; Surgeon, C. F. Stokes; Paymaster, John Irwin, Jr., and Chaplain, W. T. Helms.

ALL THE NAVIES STUDYING WIRELESS TELEGRAPHY.

Many experiments are being carried out abroad in the use of wireless telegraphy. France has fitted some of the Mediterranean squadron with outfits and trials have been carried out between the different ships and between the ships and forts ashore. The results are reported as being very satisfactory. Russia has also obtained very satisfactory results in her navy with the Popoff system. Wireless telegraphy has been used by the British in South Africa, where by the use of kites for the vertical wires, it was found possible to transmit messages over a distance of 85 miles. Some of the vessels of the Channel (British) fleet have had apparatus installed on board, and it is the intention to give the system a severe test during the summer maneuvers. Germany has been experimenting with the Marconi system. On May 15 a maritime telegraph station was established, by way of experiment, on board the light-ship Borkum Riff, with limited day service from 6 a. m. to 8 p. m. The new station is connected with that of the Borkum light-house, the object being to transmit messages from and to ships at sea. The North German Lloyds Co. are equipping their ships for its use.

WILL NOT EXTEND CONTRACT TIME.

Several of the contractors building torpedo boats for the government are behind in their work and will be required to pay heavy penalties unless congress comes to their relief. Several days ago Mr. Lewis Nixon, one of the contractors, wrote to the navy department, saying that he had been unable to complete the torpedo boats Nicholson and O'Brien by the time specified in the contract, namely, Oct. 1, and asking for an extension of time. The board of naval construction recommended the granting of his request, on the ground that the government has no need of the vessels at present and it would be an expense to maintain them at a navy yard. Secretary Long denied the application. He based his action on the fact that the company had already been favored with one year's extension of time, and held that there is no good reason why it should be further exempted from the penalties named in the contract. Similar action was taken in the case of other torpedo boat buiders who received contracts at the same time as Mr. Nixon and who have also failed to complete the vessels within the contract time.

No less than fourteen of the Hamburg-American line boats and fifteen belonging to the North German Lloyd are now in the service of the German government in connection with the Chinese war.

LIPTON TALKS OF THE NEW SHAMROCK.

In an interview in London with the correspondent of the New York Sun regarding his challenge for the America's cup, (after its acceptance by the New York Yacht Club), Sir Thomas Lipton said that he had challenged for the best three out of five races. There was no need for further negotiations. The conditions were exactly the same as those of last year's races with the exception of the ones mentioned. Regarding the New York Yacht Club's mention of accidents, Sir Thomas said he would consider that later. He thought it would be satisfactory. He believed it meant if there was an accident to either boat the other must sail over the course in the specified time before it was declared a winner. With reference to the request of the New York Yacht Club that the time of starting the races be extended to 2 o'clock in the afternoon, Sir Thomas said it was wholly a question of the state of the wind at the time of the start. If the wind was light the race could not be finished in the time limit, though at Sandy Hook a breeze sometimes arose quickly, allowing a race to be finished. Sir Thomas said he would like to know if there would be plenty of light to finish the race if the time was extended. Altogether he considered the suggestion a reasonable one, and he thought he would accept it. Sir Thomas added that G. L. Watson would design his new yacht. The building contract has not yet been allotted. Continuing, he said:

"We will build this time up to the limit of 90 ft., though Shamrock I. was a few inches less. I believe this will increase the speed very slightly, but we mean to take every opportunity we can. Shamrock I. never was properly trimmed and never got into proper tune, as it were. After her arrival she was ballasted, but her designer was lying sick. Anyhow, Shamrock I. never was as good as Columbia, however you take her. I have stuck to the name Shamrock. Win or lose I want no better. The challenger will be the best boat ever built in this country. She will cost probably proportionally more than Shamrock I. One of my chief difficulties will be time, as crossing the Atlantic necessitates changing the rig twice. We have got to build a boat strong enough to stand a heavy sea, which would be all right if we had plenty of time, but as the races will take place next August you see we have not much time to lose."

Referring to the statement that he said he was willing to become a poor man again if he could "lift" the cup, Sir Thomas said he could not see why such a statement was attributed to him. He was willing to sacrifice a lot for the cup, but there were other sacrifices than mere money. It entailed much care, time and thought. It was a serious business, because the Herreshoffs were people who made it no light task to compete with them. He was sure no one was better than they as designers. They were the brainiest and cleverest people. It would only be a waste of money to build against them unless the best possible assistance was received. Sir Thomas believes that the Herreshoffs will build a boat that will be better than the Columbia, but says they are not so foolish as to tell how much better she will be. He added:

"However, I expect to build a boat that will beat the Herreshoffs' best effort. There is one thing of which I can assure the public. I am delighted to think of the pleasure I will have in again meeting the members of the New York Yacht Club. I know everything will be done to assist me and to put me in a position which will make it impossible for me to complain, and I also feel that if ever they do err in anything it will be in my favor."

THE WORLD'S GREATEST STEAMSHIP LINES.

BRITISH LINES.

Name of Company.	Gross tonnage.	No. of vessels.
Peninsular & Oriental	279,597	56
British India	277,711	195
Elder, Dempster & Co.	183,621	72
Thomas Wilson, Sons & Co.	170,709	87
White Star Line	126,940	22
Allan Line	124,785	34
Ocean Steamship (A. Holt)	122,091	49
Pacific Steam Nav. Co.	117,969	38
Clan Line	117,368	39
Cunard Line	110,309	28
Anchor Line	108,402	31
T. & J. Harrison	102,549	28
Maclay & Macintyre (Glasgow)	95,200	45
Union Line	91,580	18
Prince Line	88,432	40
Johnson Line	84,781	25
Lamport & Holt	83,967	32
F. Leyland	82,584	24
R. Ropner & Co.	76,572	35
Castle Line	74,029	17
West India & Pacific	70,587	17

OTHER LINES.

Hamburg-American Line	286,945	..
North American Lloyd	265,613	..
Hamburg South Amer. Stm. Nav. Co.	100,646	..
Hansa Steamship Co.	84,867	..
Messageries Maritimes	229,837	..
Cie. Generale Transatlantique	166,701	..
Navigazione Generale Italiana	171,041	..
Austrian Lloyd	146,560	..
Compania Transatlantica	121,161	..
Nippon Yusen	161,698	..
American Line	116,950	19

The foregoing list does not in any case include vessels under construction.

A dispatch from Montreal announces that the Elder-Dempster Steamship Co. has closed a contract for the building of three very large vessels for the St. Lawrence trade. An effort is to be made to provide light draught so that the vessels may be loaded to the limit at Montreal. One vessel is to be built by Sir William Armstrong & Co., Newcastle, and two by Swan & Hunter, Wallsend-on-Tyne.

PNEUMATIC TOOLS AT PARIS EXPOSITION.

All reports from the Paris exposition are to the effect that in metal-working tools, especially, American manufacturers have spread themselves and are quite certain of deriving great advantage from their exhibits. As shown in one of the illustrations presented herewith, the Chicago Pneumatic Tool Co. went so far as to have a section of a steel ship erected at the exposition, so as to show their different ship yard tools in actual operation. The Chicago company has sold tools in all parts of the world, but in the European ship yards they find a very large market and hence the pains they have taken to make a special show on this score. An article in the Railway & Engineering Review tells of the interest shown in this exhibit. The Review says:

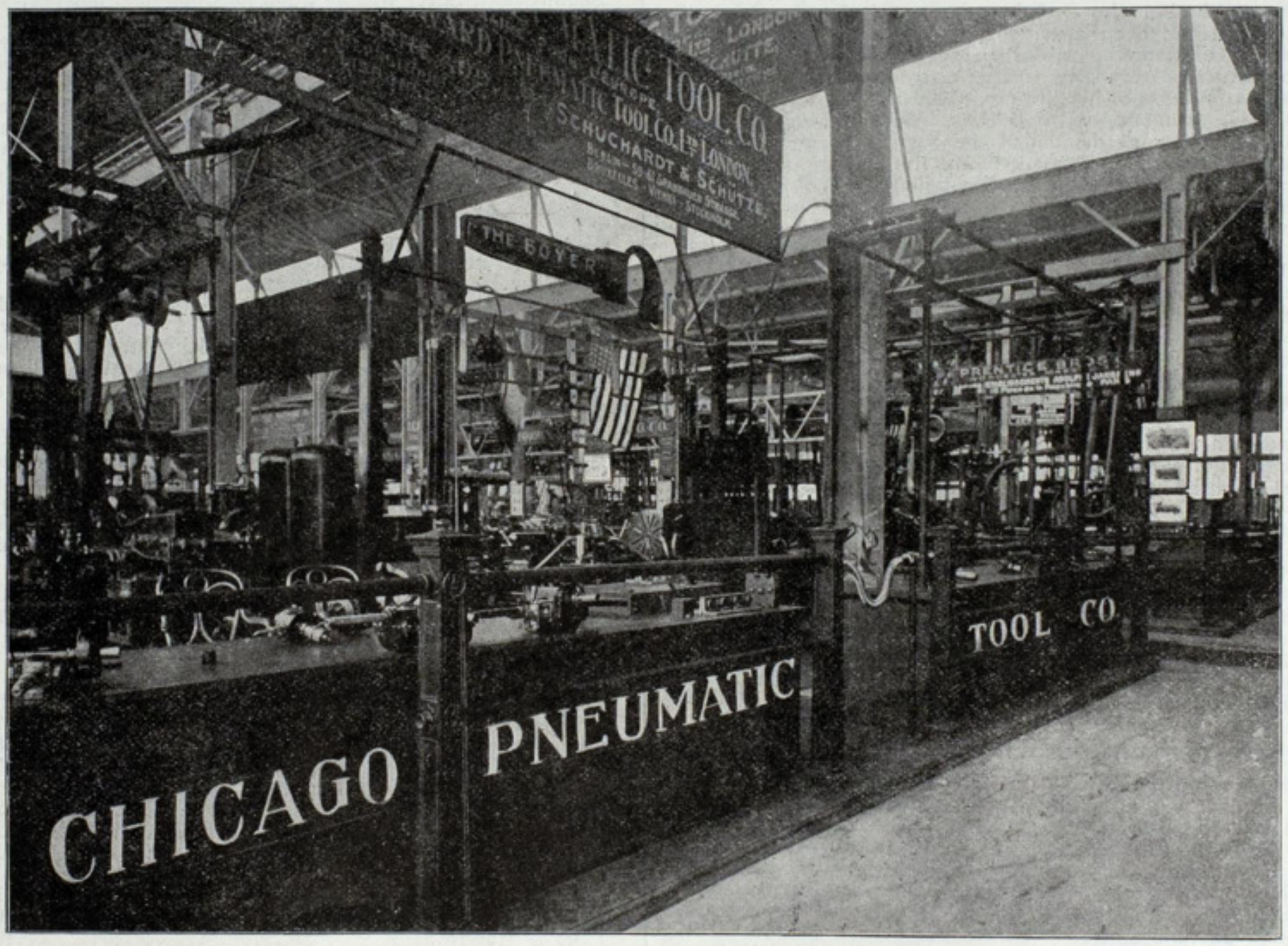
"The American machinery building at the Bois de Vincennes is a great success, notwithstanding the apprehension originally felt regarding its location. It has been and is daily visited by engineers, manufacturers, etc., from all parts of the world. The exhibits are carefully examined. Many orders have been taken, and the future results promise to be very important. In approaching the building the visitor's attention is first attracted by the out-of-doors exhibits, prominent among which appears a section of a steel ship shown by the Chicago Pneumatic Tool Co. Of the three separate exhibits made by the Chicago Pneumatic Tool Co., the out-of-door exhibit at Vincennes showing the full-sized section of a steel hull of a ship in course of construction was easily the most interesting, as being an object-lesson of an entirely novel character, it seemed to possess an attraction for thousands in attendance at the fair.

"In saying this, we must not pass over too lightly the interior exhibits, one of which was in the palace of electricity and machinery at Champ de Mars, and another inside the building at Vincennes. Both of these were points of interest, and were very complete in every detail, showing the smaller machines made by this company, many of them in actual operation; in fact, all those which could be operated without jarring upon the sensitive nerves of the visitors, on account of the necessary amount of noise which must accompany any operation for riveting and like work.

"In the picture of one of the interior views those familiar with pneumatic appliances will recognize the well-known hammers and drills, pneumatic hoists, and the scores of other devices manufactured by this company. As stated above, the two interior exhibits, while not exact duplicates, were similar in that they showed about the same line of tools, but the open-air exhibit had the advantage of being free from restraint or restriction on account of possible noise, and during the fixed hours each day when this outfit of appliances was known to work, the crowd would assemble and gaze in astonishment at the almost automatic action of all the machines used in connection therewith.

"Naturally, in ship work the riveters, in connection with the long-stroke hammer, were the principal feature. It was shown in its various capacities, as, for instance, flush deck riveting, riveting keelson plates and frames, sheer strake riveting, driving 1¼-in. rivets on side of ship, and in cutting off surplus metal. Next in importance, perhaps, the pneumatic drill should be mentioned, drilling and reaming the necessary holes, cutting out holes for side lights, etc. The various forms of yoke riveters, where applicable to the work, came next, and then the armor scaling machine removing the imperfections from the plates where occasion required.

"As adjuncts to these various appliances were necessarily the compressor for supplying the requisite amount of air for the operation of the tools, the pneumatic hoist for lifting materials about according to the requirements of the work, oil rivet heating forges for heating the rivets, and so on through the entire list of appliances especially adapted to ship work. All these machines were operated by men familiar with their special adaptability, so that the effect, both in work accomplished and in the eyes of the spectators, was quite remarkable. The fact, that, as the result of these exhibits, the Chicago Pneumatic Tool Co. was given the highest award and two gold medals, will serve to illustrate the impression which the exhibits made upon the international board of jurors. On the whole, it may be said that the display of American-made pneumatic tools was highly creditable to the United States."



ONE OF THE EXHIBITS OF CHICAGO PNEUMATIC TOOL CO. AT PARIS EXPOSITION.

RECOMMENDATIONS REGARDING THE NAVAL ACADEMY.

The report of the board of visitors to the naval academy, made public a few days ago, contains several interesting recommendations. The board wants the title of naval cadet changed to midshipman, because of "its association with the early history of our navy and its distinctly marine flavor." Considerable space is devoted to pointing out what the board believes are bad effects of the amalgamation of the engineer corps with the line of the naval personnel act. It suggests improvements in the engineering course at the academy, in which all cadets should be included, and says that every young officer in the line of the navy should be required to stand watch in the engineer room as well as on the deck, and take responsible care of the machinery of ships.

"Every officer who is going to command on deck," the board says, "ought at least to spend one cruise in engineering duties," and adds that unless officers get engineering experience, "the amalgamation of the line and engineer corps bids fair to do great harm to the naval service." It recommends that the department of steam engineering be divided into two departments—engineering and applied mechanics. The board thinks the entrance examinations should be made more stringent. It says that these examinations "are now conducted in an unsystematic and troublesome manner," five separate examinations having been held between May 15 and July 1 of this year. In the opinion of the board two entrance examinations are enough. Among other things the board says:

"It is noticed that when the national anthem is played, officers and cadets acknowledge it by standing at attention and looking in the direction of the music. In the opinion of this board officers and cadets should also uncover. Their example would be followed by civilians who happened to be in their presence, and the effect would be salutary, not only at the academy, but also in places away from military or naval jurisdiction."

These are some additional recommendations of the board:

That the age limit for admission to the naval academy be fixed at fifteen and eighteen years.

That English replace grammar, spelling and punctuation as a subject for entrance examination.

That the equipment and facilities for teaching engineering be made equal to those of the best modern schools.

That the sum of $5,000 be appropriated for providing lectures by men eminent in their professions outside the navy.

That the superintendent of the naval academy be responsible directly to the secretary of the navy for the government of the institution.

That cadets be required to salute ladies by lifting their hats.

That a fixed sum, instead of a per diem allowance, be appropriated for the entertainment of the board of visitors.

PNEUMATIC TOOLS ON BRIDGE WORK.

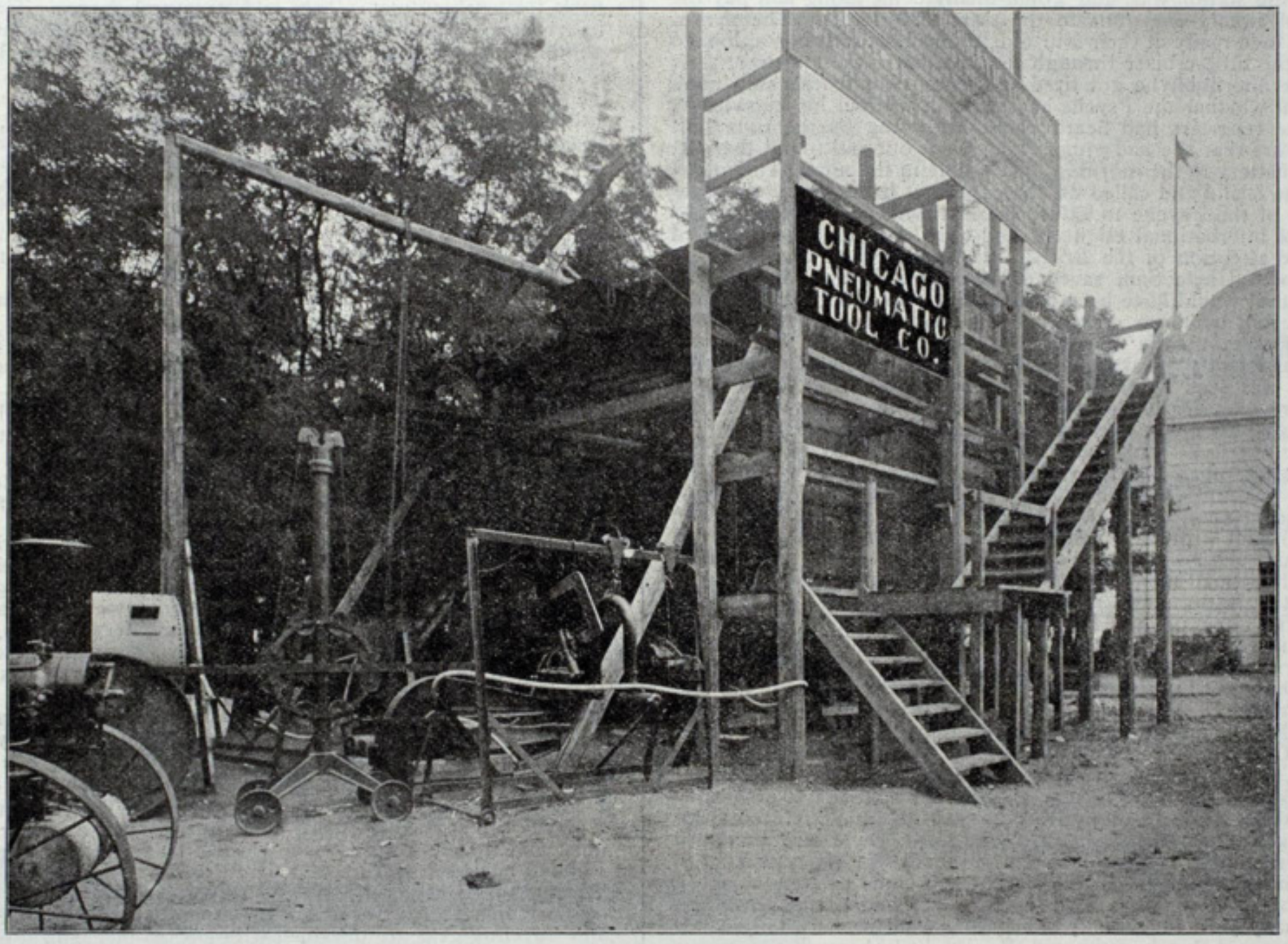
At a recent convention in St. Louis of the Association of Railway Superintendents of Bridges and Buildings some very interesting reports were presented on the subject of hand versus air riveting power. The kind of work on which these bridge superintendents are engaged is more or less similar in character to ship building, and therefore of interest to readers of the Review. Mr. A. B. Manning of the Missouri, Kansas & Texas Ry. says:

"With pneumatic riveting hammers I find two men and one heater can average daily (ten hours) 500 rivets, whereas by hand 250 rivets per day was a good day's work (more often less) for three men and one heater. One day we drove 700 rivets, by using an additional man to take out fitting-up bolts, etc. This was the work of one air hammer only. In inspecting rivets I find the work far superior to hand work—less loose rivets, heads invariably perfect, shank of rivet filling hole, and in every way far superior to hand work done by our men, or by others in the past. It is also true that work can be done readily in places where great difficulty has been experienced with hand tools. It seems useless to call attention to the benefit of reamed holes in assembling joints made by pneumatic drills over the 'drift pin work,' so much in use where hand riveting prevails; but with the rapidity that air drills run, the expense of reaming rivet holes has been reduced to a minimum. The pneumatic plant in use on this road for bridge work consists as follows: One 12 H. P. Fairbanks, Morse & Co. combined gasoline engine and air compressor; two galvanized iron water tanks; one galvanized iron gasoline tank; one boiler iron main reservoir, large; one boiler iron auxiliary reservoir, small; all necessary fittings, etc., and mounted on box car; one No. 2 Boyer pneumatic hammer, old style; two new Boyer 000 1 6-16x5 in. pneumatic hand riveting hammer; two hand steam drills (running them with air), with necessary hand, spring and air dollies, rivet snaps, forges, drill bits, reamers and other small tools necessary to this class of work.

"The 12 H. P. gasoline engine and air compressor furnishes more than enough air to operate all of our tools at the same time. By using the small reservoir at bridge and main reservoir on car, and operating at 90 lbs. pressure, we have had in use at one time three hammers, two drills, two heater forges and one blacksmith forge, and have been able to get full capacity out of all of them. We have now ordered additional tools, as we find we have sufficient power to operate them, especially when cutting out the old steam drills. In using these hammers we find they are free from vibration or concussion that had been somewhat of a drawback to pneumatic hammers I have noticed in the past. We use hand riveters only in field work on bridges, as we have not driven over ⅞ in. diameter rivets, and think in such class of work it is more economical than a yoke riveter. In handling larger rivets, repairing or rebuilding work done in yards or shops, a yoke riveter could be worked to good advantage. In field work there were many difficulties when doing hand work that would cause delays that are now overcome quickly by use of air. In chipping, cutting out, reaming, drilling, etc., work can be done in a fraction of the time that it used to take, and when done you have a good, presentable piece of work; in fact, I consider pneumatic tools are so far ahead and superior to hand work in everything that it is practically unnecessary to dilate their uses. It costs us the same to spur out at bridge site, as we always spurred out when running a hand gang and by increasing pipe line we can invariably find a good location for the outfit car with small expense. In putting in staging or false work for riveters we find the cost is less, and by doing the work faster by air enabled slow orders, or delays to movement of trains, to be reduced.

"I think the amount invested in a good pneumatic plant is one of the best investments a railroad can make, especially now that steel structures are so much in evidence on all first-class roads."

"With reference to a comparison between hand riveting and air machine riveting and drilling," says Mr. O. J. Travis of the Illinois Central Railroad, "it might as well be stated at the outset that I consider comparisons odious. I have had one 12 H. P. and one 22 H. P. gasoline compressor at work, the former for nearly two years, the latter for nearly a year on various kinds of work—reinforcing, drilling, riveting and chipping, both in the field and shop. All air work has been done with a most satisfactory measure of economy over hand work. We have done over five or six times as much drilling with a like number of men as we were able to do with ratchets, and in places inaccessible to hand ratchets we do over twice to three times as much riveting with air as we can do by hand, and do the work 50 per cent. better. In fact, I cannot say too much in favor of the air machines. They are all that could be desired. I may add, however, that I have substituted the latest patterns of hammers as fast as they have been improved, and with the best of results."



SECTION OF STEEL SHIP ERECTED AT PARIS EXPOSITION TO SHOW OPERATION OF CHICAGO PNEUMATIC TOOLS.

MONEY IN OYSTER FARMING.

The question of oyster planting has two sides, and far-sighted persons who look to the general interest generally believe that it would be well to promote the planting of oysters where at present none grow. The Trade of Baltimore, which speaks for the canning interest, says: "We do not think it is putting the case too strongly to say that there is no other property in the United States that is of equal natural value with the oyster beds of the Chesapeake bay. It is also true that there is no industry or property value in the United States that is as much neglected and injured as those same oyster beds. Even the great Consolidated Virginia mine, which has proved in modern times a wonder of the world, lacks a quality which the Chesapeake oyster beds possess. We mean the ability of recuperation. A gold mine, no matter how valuable, may be exhausted, and even if it is not, it becomes steadily more costly to bring the ore to the surface as the burrowing is done deeper and deeper into the bowels of the earth. The oyster, on the other hand, if given the merest chance of a summer's vacation, will restock and replenish the beds in a manner that is astonishing, and which returns such an immense percentage of value annually that it is difficult to compute it. It is this remarkable quality of the oyster itself, the silent and shiftless worker creating values steadily for the general owners, that is being most of all overlooked by those who are most interested in observing it. The oyster harvest of the Chesapeake bay, as that harvest comes to this city, or through its merchants or packers, instead of being only about 5,000,000 bushels, as it was last season, should be nearer 50,000,000."

William Parker, who was for thirty years treasurer of the Roach ship yard at Chester, Pa., died a few days ago of pneumonia at the good age of seventy-nine. Mr. Parker was one of the best known, honorable and conscientious men in the ship building business on the Atlantic coast.

The Deutschland's coal consumption on a recent Atlantic voyage varied from 560 to 580 tons per day. The indicated horse power varied approximately from 35,000 to 37,000.

VISIT OF THE PSYCHE.

Ships were nodding, curt'sying, bowing,
Ships in those regions are so polite.—Calverley.

The third-class British cruiser Psyche never nodded a nod. She created something of a sensation Monday by dashing into the port of New York regardless of fog, quarantine regulations and international courtesies, and dashing down the bay again as if she were pursued by a squadron of hostile warships. Never a cruiser, or any other war craft of any nationality, dispensed with conventionalities so nonchalantly as the Psyche. Her mission in New York from Halifax was merely to grab Assistant Paymaster Roe of her Britannic Majesty's navy from the custody of Uncle Sam and convey him back to Bermuda to be tried for embezzlement. The Psyche was sighted by the marine observer off the Hook just after dawn. He could not make out her name. The reporters at quarantine saw her coming up through the narrows two hours later. She scooted past quarantine through a mist and the reporters were unable to distinguish her name. Under the regulations of the port all vessels, whether warships or merchantmen from foreign places, are expected to undergo inspection by the health officer. In the case of naval ships the examination is perfunctory, the health officer accepting the declaration of the ship's surgeon. Maj. Albert L. Myer, commandant at Governor's island, heard of the coming of the British cruiser just after she passed in at the Hook, and he turned out twenty artillerymen and prepared to answer the salute of the cruiser as she passed the island. The air was thick with vapor at times and the major feared that the warship might miss the island and fire a salute elsewhere. He naturally supposed that her commander, Capt. Pelly, knew where the saluting station was, and would finally come along and pay the usual tribute of twenty-one guns to the stars and stripes. The major, with his twenty men ready at their four old Rodman smooth bores, looked out vainly for the little cruiser through the fog that came and went. At 4 o'clock in the afternoon he got tired and came over to the ship news office to find out whether the Psyche had come in without his knowledge. The ultramarine reporters had heard about her going up the river, but they were not sure that she had gone. They went out and found that she had passed the battery in the morning, just visible in the mist. The major went back to the island and called off the expectant batterymen. He said that the failure of the Psyche to salute the fort while passing the island was a breach of international etiquette, and that he would be compelled to call it to the attention of the British consul-general at this port, Sir Percy Sanderson. Uncle Sam saved $22.68. That is the value of the brown powder that would have been rammed into the old guns and made the walls of the big buildings down town reverberate for a few minutes.

The cruiser went up the North river and anchored off Thirty-fifth street, got the assistant paymaster aboard, lifted anchor and headed down the river. She was seen by several harbor pilots, including Capt. John Bradley of the revenue service, passing the statue of liberty about 5 P. M. Capt. Bradley supposed that she was returning to quarantine to be inspected, but she was not. Quarantine said that a few hours after she had run past on her way up North river, Health Officer Doty's assistant, Dr. L'Hommedieu, was sent after her in a tug. He formally cleared her without any but the pleasantest communication with her commander. She had come in without a pilot, which is a common thing for British war vessels to do, and started up the crowded North river as if she were in command of a ferryboat skipper, who had been all his life dodging river craft. She kept right on, and through the gallantry of the Yankee pilots escaped being run down or disabled. At last she ran afoul of Capt. Dave Roach of the tug Barrett. Dave knows a dollar when he sees it. An officer of the cruiser hailed him and asked him the way to Thirty-fourth street. Capt. Dave said: "I'm going that way myself. Stick by me and I'll pull you through." The cruiser was within a few blocks of her anchorage, according to one of the admirers of Capt. Dave's nerve. After a little while Capt. Dave shouted, "There's Thirty-fourth street." A moment later Capt. Dave went alongside the cruiser with a bill for $75. Capt. Pelly looked at the bill seriously and decided that the British navy would not stand for services at the rate of $300 an hour. He compromised by paying Capt. Dave $15 in cash, and Capt. Dave said afterward that it was satisfactory. Others said it was about $14 too satisfactory.

Sir Percy Sanderson said that the Psyche had come to New York on a special mission and not on a formal visit. He had notified Admiral Barker at the navy yard in Brooklyn that she would be here only a few hours. Sir Percy said that he supposed that she had observed the proper naval conventionalities. "She came up in a dense fog," said he. "Capt. Pelly afterward told me that he had the utmost difficulty reaching his anchorage, and that if it had not been that the ferryboats and other craft in the river took care of him he might have got into trouble. The consulate conferred with Dr. Jenkins, one of the health commissioners, who called up Dr. Doty and obtained permission for the Psyche to pass quarantine.—New York Sun.

OREGON TO GO TO PUGET SOUND.

The battleship Oregon, which was injured by striking Pinnacle Rock off the north coast of China and temporarily repaired at Kure, Japan, is to be brought home for extensive repairs as soon as the battleship Kentucky reaches the Asiatic station. The assignment of the Kentucky to the Far East was due to knowledge that the Oregon's injuries would necessitate bringing her back very soon. The Kentucky will reach the Asiatic station in about two months, if not greatly delayed in New York on account of difficulties with her superposed turrets, and the Oregon will then start by the Pacific ocean route for the Bremerton naval station on Puget sound, where her injuries will be repaired. Reports to the navy department show that the Oregon was patched up in a crude way in the Kure dry dock. Owing to the limited time given by the Japanese government for repairs to be made it was necessary to get the Oregon into condition with the limited material at hand. Some of the holes in the ship were patched with wood, and then covered with cement. No attempt was made to repair anything except the outer bottom. Much injury was done to the interior of the vessel, stanchions being twisted and bulkheads strained. The work of putting the Oregon in first-class condition will take some time. It is the intention of the navy department to make the Puget sound establishment an important repairing station. The department is very much dissatisfied with the character of the repair work on United States vessels at private dock yards in the Far East, and Rear Admiral Melville, engineer-in-chief, has asked for an appropriation of $1,000,000 to construct a machinery repairing ship to be sent over there. Most of the construction work will be done hereafter, however, at Puget sound. In preparation for making the repairs on the Oregon the navy department has ordered naval constructor Frank W. Hibbs from the Mare Island navy yard to the Puget sound naval station, where he will be in charge of the construction department. He will be succeeded at Mare Island by Naval Constructor Frank B. Zahm, principal assistant to Chief Naval Constructor Hichborn in Washington.

TRADE NOTES.

The Magnolia Metal Co., No. 266-267 West street, New York, have sent out to their customers as an advertisement a 15-inch ruler, one of the most convenient things to have in an office.

Official notice has been issued of the annual meeting of stockholders of the Roberts Safety Water Tube Boiler Co., to be held at Red Bank, N. J., Nov. 1. A 10 per cent. annual dividend (the tenth) will be declared.

"In spite of the disturbing influence due to election times," says one of the officers of the Buffalo Forge Co., "our books still give evidence of increasing activity along the several lines in which we are engaged. Owing to press of work in our engine department, for instance, we have been compelled to run night and day on that branch of our work to keep up with orders."

No more carefully printed catalogue has come to our notice than that of the Hilles & Jones Co., Wilmington, Del., on the making of machine tools for working plates, bars and structural shapes. There are exquisite half tones of punching and shearing machines, coping and notching machines, bending and straightening machines and machinery especially designed for working structural shapes.

The Joseph Dixon Crucible Co., Jersey City, N. J., has just issued a little folder on the subject of their silica-graphite paint, which gives an illustration of the Park street bridge, Big Four railroad, Cincinnati. The girders of this structure were painted with Dixon silica-graphite paint five years ago and have since successfully resisted the action of engine fumes. An average of 500 engines pass under this bridge daily.

That the advantages of mechanical draft are recognized by experts, and that it is rapidly assuming its place as a rival and successor of chimney draft is clearly evidenced by the fact that several of the technical schools have recently placed orders with the B. F. Sturtevant Co., of Boston, Mass., for the equipment of their boiler plants with this means of draft production. In several cases the fans have been so installed as to provide opportunity for experimentally comparing the chimney with the fan.

"Springs" is the subject of catalogue No. 4, issued by the American Steel & Wire Co. The company makes springs from the ground up—mining the ore, making the pig iron, making the steel, rolling the rod, drawing the wire, tempering the springs and japanning, coppering, tinning and nickel plating them. There are springs and springs made by this company: agricultural implement springs, buffer springs, bicycle springs, bed springs, car springs, car truck springs, cart and wagon springs, clock and watch springs, door springs, electrical machinery springs, furniture springs, gun springs, gun carriage springs, governor springs, hay tedder forks, hay loader teeth, helical springs, hinge springs, lock springs, loom springs, machinery springs, motor springs, organ springs, pillow springs, pop valve springs, rocker springs, seat springs, trolley springs, upholstery springs, valve springs, wringer springs, wagon springs and washing machine springs. Springs are an important factor in the correct operation of nearly all forms of machinery and many utilities. Exactness, certainty and uniformity of action, reliability and correct material are absolute requisites. The American Steel & Wire Co. is equipped to meet all the requirements of a perfect spring.

The Sprague Electric Co., Nos. 527-531 West Thirty-Fourth street, New York, have just issued bulletin No. 203 on their electric trolley hoist and traveling hoist. The electric trolley hoist is operated with two Lundell enclosed motors of 1 H. P. each. One motor is connected by gearing to the Harrington hoisting mechanism below, while the other connects in a similar way to the traversing wheels above. Both the hoisting and traveling gear are provided with electro-mechanical brakes, which are automatically released when the motors are put in operation, and applied when power is cut off. The control of the motors is obtained through the pendant chains or cords, there being one cord for each direction of motion on the two respective motors. The controls are entirely enclosed and are arranged so that they may be provided with automatic limit cut offs which shut off the power when the limits of motion have been reached. The machine may have a hoisting capacity of 500 to 800 lbs., as desired, the speed of hoisting the smaller load being 1 ft. per second, with a corresponding reduction for the heavier load. The traversing speed is six miles an hour. Power is taken to the hoist through trolley wires in the ordinary fashion of traveling cranes. The weight of the complete apparatus is 750 lbs. For ship yards, docks, warehouses and similar locations requiring handling over considerable distances this hoist is particularly adapted. The electric traveling hoist consists of a small truck, mounted on flanged wheels, which carries the hoisting mechanism, motor and controller. The hoist is a standard Harrington hoist which is geared to a Lundell standard 1 H. P. enclosed motor. The controller is of Sprague special design and will operate at several different speeds, from a barely perceptible motion to the maximum speed. It is operated by the pendant cords and handles and will lift a load of 4,000 lbs. at a maximum speed of 6 ft. per minute. The apparatus makes an ideal one for packing or shipping rooms.

The annual convention of the Association of Bridge and Structural Iron Workers was held in Pittsburg this week. The convention suggested the formulation of a scale of wages to be paid to structural iron workers all over the country, and to do away with the many different scales paid at the present time.

Contracts for furnishing 159 mushroom anchors, each weighing about 3,000 lbs., at Willett's Point, N. Y., have been awarded to the Chattanooga Car & Foundry Co., Chattanooga, Tenn., at 82½ cents per 100 lbs.

SHIPPING TRADE OF HOLLAND.

From Fairplay, London.

All the Dutch shipping companies, both large and small, are adding to their fleets and increasing their capital, besides which several new firms or companies have been established of late. Amsterdam and Rotterdam are, of course, the two great centers of the shipping trade, and to be acquainted with the commercial status of these two places is to know that of the entire Netherlands. The commercial transactions of Holland total up annually to about £248,000,000 sterling. This prosperous state of things greatly favors the development of the shipping trade, and new enterprises are continually being entered into. Thus we see that, in spite of Amsterdam's inferiority to Rotterdam, a regular service from that port to the River Plate is about to be started by a company disposing of a capital of 4,000,000 florins, and for which four steamers are now being built. On the other hand, a wealthy firm of Rotterdam is said to have acquired extensive iron mines in Algeria, from which the supplies for Krupp's works at Essen are principally drawn, and the raw material from these mines, hitherto transported under the Spanish flag, will in future be conveyed by Dutch ships which, on the outward voyages, will take up coals in British ports for the Mediterranean. Another sign of Dutch maritime progress is that, for the first time in several years, the Netherlands-American line has found itself in a position to pay a dividend to the shareholders, and very soon the fleet of this company will only include vessels of the largest size, namely, the Potsdam, recently launched, the Rijndam and the Noordam, now on the stocks, and the Rotterdam and Statendam, already in active employment. Two new boats, each of 3,400 tons, have besides been launched for the Nederland company (the Buli and the Soembawa), while three others (the Florès, the Koning Willem II and the Koning Willem III) are now on the stocks, and another (the Ambon) has been ordered. In the course of 1899 twenty-five steamers, measuring 47,192 reg. tons, were launched for the Dutch mercantile marine, and twenty-one, measuring 93,250 tons displacement, are now in course of construction; of these twenty-one, twelve are being built in Dutch yards. There are sixty-one ship building yards in Holland, and they were all busily employed last year, having turned out no less than 450 vessels of various types and dimensions, besides a floating-dock of 4,500 tons; two-fifths of these new vessels were built on foreign account. Fifty-seven of these establishments are now at work, and the number of vessels on hand is 190, most of them for foreign owners. Some statistics published by the Journal des Intérêts Maritimes give the result of the maritime movement in the ports of Amsterdam and Rotterdam during the period from 1893 to 1899. The following are the figures. The tonnage is given in cubic metres, at the rate of 2.83 c.m. to the register ton:

	Amsterdam.		Rotterdam.	
Year.	Ships.	Cubic metres.	Ships.	Cubic metres.
1893	1,558	4,512,347	4,599	14,754,985
1894	1,666	4,496,613	5,157	17,828,123
1895	1,676	4,987,295	5,094	17,866,354
1896	1,848	5,557,529	5,877	21,518,938
1897	1,940	6,153,370	6,177	23,622,651
1898	1,868	6,060,000	6,277	25,052,502
1899	2,028	6,966,123	6,901	27,539,328

The figures relating to Rotterdam, however, do not comprise the whole movement at the port, the development of the inland navigation via that port being pretty nearly equal to the oversea trade. The trade of the other ports of Holland—Harlingen, Dordrecht, Schiedam, Vlaardingen and Flushing—is very insignificant when compared with that of Rotterdam and Amsterdam, the entries at all five ports together last year being only 868 vessels.

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Quotations furnished by HERBERT WRIGHT & Co., Cleveland, date of October 24, 1900.

NAME OF STOCK.	OPEN	HIGH	LOW	CLOSE
American Steel & Wire	36	36⅜	35⅜	35⅜
American Steel & Wire, Pfd	75¾	76	75½	75½
Federal Steel	40	40½	39¼	39¼
Federal Steel, Pfd	68	69½	68	69½
National Steel	30	31	29⅞	29⅞
National Steel, Pfd	87½	.....	.....	87½
American Tin Plate	34½	35	34½	35
American Tin Plate, Pfd	82	82½	82	82½
American Steel Hoop	24¾	25	24	24
American Steel Hoop, Pfd	73	.....	.....	73
Republic Iron & Steel	14¼	14⅝	14⅛	14⅛
Republic Iron & Steel, Pfd	57	57¼	57	57

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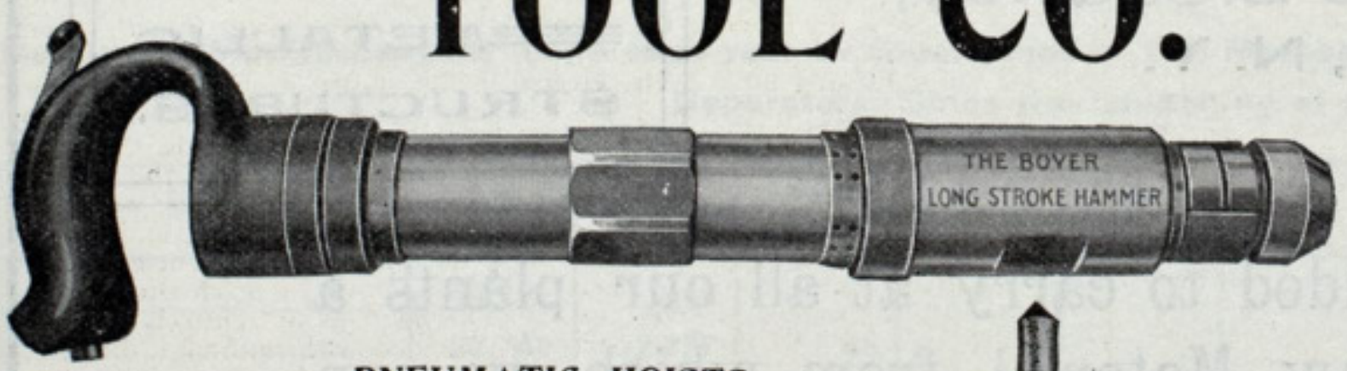

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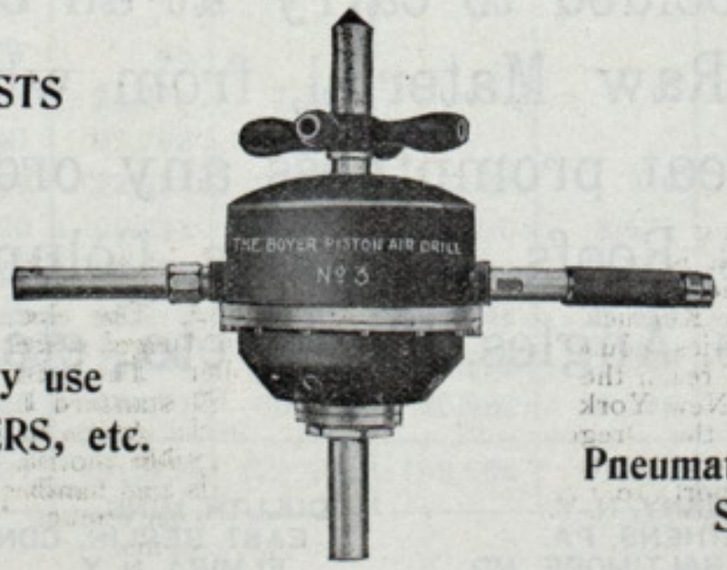

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AMONG THE SHIP BUILDERS.

AN ORDER FOR TWO 12,000-TON FREIGHTERS PLACED WITH THE MARYLAND STEEL CO.—REPORT THAT THE RISDON IRON WORKS OF SAN FRANCISCO IS TO ESTABLISH A YARD NEAR NEW YORK—OTHER ITEMS OF GENERAL INTEREST.

Mr. R. L. Mead, secretary of the Risdon Iron Works of San Francisco, was in New York, a few days ago, en route to Washington, and as a result of his visit to the east it is reported that the San Francisco company contemplates the establishment of a ship yard near New York. It is said that the Risdon officials have negotiations under way for a tract of land comprising about 100 acres and which is located on the New Jersey coast within an hour's ride of New York city. As the San Francisco company has been acquiring additional land of late and now has 1,700 ft. water frontage on San Francisco bay, with a very large dry dock under construction, the report of another works near New York is probably doubtful, but Mr. Mead would neither confirm nor deny it. His visit to Washington is in connection with the contracts soon to be let by the government for eleven vessels of war—five battleships and six armored cruisers. Under the law not more than three of these ships may be built on the Pacific coast. These may be two battleships and one cruiser, or two cruisers and one battleship. Mr. Mead says that the Risdon Iron Works intends to submit bids for the construction of the three Pacific coast vessels in competition with the Union Works of San Francisco, which has built all the vessels of war thus far turned out on the Pacific.

Norfolk (Va.) papers have been talking for several months past of a ship yard enterprise that has been under way at that point. A late report, which follows, is to the effect that the necessary funds have been secured: "A quarter of a million dollars is to be immediately expended in the big yards of the Norfolk Ship Yard & Dry Dock Co., Norfolk, Va., and the work of breaking ground on the site recently purchased for $50,000 will shortly begin. Messrs. H. L. Page & Co. are placing the first issue of the company's bonds—$250,000. Of these $150,000 have been purchased by the Security Co., of New York, the financial backers of the enterprise, and others have been sold in Boston, New York and Norfolk. There are now only $48,000 of the first issue to dispose of, and these are expected to be sold in the next few weeks, after which a permanent organization will be effected, with Mr. Charles M. Jessup of New York as president. Most of the other officers will be Norfolk people. Plans for the plant have been made, and some of the bids for the work have already been awarded. The yard will have three sets of ways, two small ones for ordinary-sized vessels and a larger one for ships of 5,000 to 7,000 tons."

A dispatch from Sparrow's Point, Md., announces that the Maryland Steel Co. of that place has been awarded a contract to build two very large sea-going cargo carriers. In dimensions the proposed vessels will surpass the two freighters which the company is now constructing for the Boston Steamship Co. They will carry about 12,000 tons, dead weight, and will be the largest steamers ever built in an American ship yard to fly the stars and stripes. The ships will be built entirely of steel and will be equipped with modern appliances for loading and unloading. The Maryland Steel Co. is now buying the material for the vessels and will begin construction this winter. They will be delivered about January, 1902. It is estimated that the steamers will cost about $700,000 each. The owners are said to be eastern capitalists. The ships will have no regular trade, but will go wherever the best paying cargo is offered. There are now employed in all departments at Sparrow's Point about 3,400 men. The steel rail mills are also very busy and the prospects are that all departments of the great plant will be rushed with work during the next two years.

Mr. Samuel Henry Vandergrift of Pittsburg, Pa., has closed a contract with the Gas Engine & Power Co. and Seabury & Co., of Morris Heights, New York, for the building of an 85-ft. steam yacht for use on the St. Lawrence river, which will be named the Cherokee. The keel and frame will be of oak, and the planking of yellow pine, with fastenings of copper. The machinery will consist of a Seabury triple expansion engine, with cylinders 7 in., 11¼ in. and 17½ in., by stroke of 10 in. Steam will be supplied by a water tube boiler. The yacht will have an electric light plant, and be fitted with a searchlight. She will carry a 15-ft. naphtha launch and cutter for the crew. A speed of fourteen miles an hour has been guaranteed; and the yacht will be ready for delivery about May 1 next.

The tug Lackawanna made her trial trip from John H. Dialogue & Son's ship yard at Camden, N. J., last week, and fulfilled the requirements in every particular. She is built entirely of steel, is 150 ft. over all and of 25 ft. beam. She is fitted with triple expansion engines of 800 H. P., and is guaranteed to pull six barges, each of a capacity of 1,600 tons of coal. She is equipped with her own electric light plant.

Capt. Charles T. Megee, George Tunnell, Thomas Winsmore, George Taulane & Bro., and others, of Philadelphia, have contracted with a ship building firm at Milbridge, Me., to build them a four-masted wooden schooner of 2,100 tons capacity, to be adapted for either the West India or coasting trade. The vessel is to be delivered next September and is to cost $60,000.

It is understood that there is prospect of a new ship building plant being established at Tacoma, Wash., though the project has not yet taken definite shape.

H. B. Kirby has secured a location for his new ship yard at the Export mill, Fairhaven, Wash. He expects to employ fifty men all winter.

Messrs. McKay & Dix have bought the Verona ship yard of William Beazley at Bucksport, Me.

The Old Dominion Steamship Co. has decided to build another steamer to be faster than any vessel now in the fleet. This steamer will ply between Hampton, Old Point and Norfolk on quick and frequent schedule, reducing the time of a new line just started. It will be named Kecoughtan.

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A RARE CHARACTER.

The coastwise trade abounds in rare characters, but there are probably none rarer than Capt. Lincoln Jewett of South Portland, Me., familiarly known as "Linc" Jewett, who is to command the six-masted schooner Eleanor A. Percy, built by Percy & Small, Bath, Me. Capt. Jewett is a typical Down East skipper—one of the active, nervous kind, always in a great hurry and afraid of nothing, afloat or ashore. In times past he used to be regarded by the old and careful salts as all but crazy; they shivered at some of his feats of seamanship, and predicted a grand smash for him and his vessel "one of these days." Jewett never waits for wind or weather when there is a possible chance of getting anywhere. When he was a fisherman, sailing a little smack out of Portland, he gave the fish dealers there a "turn" which made their eyes stick out. One cold and blustery day in winter he arrived with a good fare of fish and found the market bare. The weather had been so bad that no one could get anywhere or catch anything, and so it looked like a harvest time for Capt. "Linc" with his good fare. The fish dealers, however, thought differently. They argued that the weather was so stormy that Jewett would have to stay in Portland and dispose of his fare there at whatever price was offered, and so they made a pool, agreeing to pay only a certain price, with the understanding that the fish should be divided amongst them. But the scheme didn't work. Capt. Jewett told them all to go to the devil, and, to the amazement of all hands, got underway in a howling snowstorm for Gloucester, where he arrived all right and got a high price for his fare. The Portland fish dealers never tried, after that, to get the best of "Linc" Jewett. "There's no tellin' what the critter'll do," said one of them. And there wasn't.

Capt. Jewett's daring, good judgment and enterprise soon won swift advancement for him, and he graduated from the little fishing smack to a good-sized schooner in the coasting trade. He made quick trips, and piled up dividends for the owners at such a rate that they kept giving him bigger and better vessels, until, in 1894, the four-master Charles P. Notman was built for him at Bath. This was a vessel to Capt. Jewett's liking. She was of 1,302 tons net register, carried about 2,200 tons of coal, and would sail like a pirate. The way he raced her up and down the coast made the other coal luggers stare. Once Capt. "Linc" astonished the shipping world by a feat that is without a parallel in the annals of the coasting trade. There was a great scarcity of coal in Portland one winter a few years ago, and the Notman was one of a fleet of fourteen sail bound to Portland from various places with the much-wanted fuel. They had bad weather coming down from the capes of the Delaware, and when a furious storm came up most of them went into Vineyard Haven or some other harbor of refuge. Capt. Jewett, however, was in no mood for loafing in harbors. He knew that if he got into Portland with the whole fleet he might have to wait for weeks to get discharged, so he kept right along, regardless of the weather. So it was that, while the other vessels were reported as "arrived" at the Vineyard, the Charles P. Notman was reported in this way: "Passed, sch. Charles P. Notman, Jewett, Newport News for Portland."

"Passed!" That little word in the Vineyard ship news made the owners of the Notman look thoughtful, for they knew what the weather was, while sailormen declared that "Linc" Jewett was crazy, sure enough. The snowstorm continued, with a howling northeaster to spin it along, and the next afternoon, after passing the Vineyard, the Charles P. Notman flew in by Portland Head like a towering snowbank. The lightkeeper stared when she went by, thinking that he had seen an apparition, and when the big schooner came tearing up the harbor the few 'longshoremen who happened to be about were astonished, to state it mildly. Up she came, with everything on her, and rounded to off the coal docks. Then, to the amazement of all who saw it, Capt. Jewett actually docked her without the aid of a tug; he just brought her to and backed her into her berth. When he got there all the berths were empty and all the stevedores loafing, so that he got quick dispatch in discharging. Two days afterward, on his return trip, when he was running down by Cape Cod he met all the rest of the fleet coming up, and made a few cheerful remarks to such of them as passed within hail concerning quick passages, loafing in harbors and getting around the world generally. Had he waited in the Vineyard for good weather he would have got into Portland with the bunch, and, as vessels have to take their turn in discharging, he might have had to wait two weeks or more before he got the coal out of the Charles P. Notman's hold.

Horse show at Chicago—For this occasion the Nickel Plate road will sell tickets at one and one-third fare for the round trip on Oct. 28, 30, and Nov. 1, good returning on any one of our peerless trio of daily express trains where scheduled to stop, to and including Nov. 5, 1900. Write, wire, 'phone or call on nearest agent, C. A. Asterlin, T. P. A., Ft. Wayne, Ind., or E. A. Akers, C. P. & T. A., Cleveland, O. 259, Nov. 1

Secretary Long of the navy has ordered that there be no further proceedings in the case of Capt. Geo. F. F. Wilde of the Oregon, who was investigated by a court of inquiry to determine the responsibility for the grounding of the battleship in the Gulf of Pechili last summer while hurrying to Taku from Shanghai. This action finally disposes of the matter.

The White Star gigantic liner Oceanic, which on a recent voyage carried 412 saloon, 255 second-class and 1,233 steerage passengers, or 1900 all told, has not, as reported, made a new transatlantic passenger record. The record is still held by the new and smaller Cunarder Ivernia, which on her maiden voyage carried no fewer than 1,915 passengers and on a more recent trip 1,935.

Directors of the United Steamship Co., Copenhagen, are about to place an order for building a 10,000-ton steamer for the Copenhagen-New York route.

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1890	22,576	820									
1891	22,749	22,777	68								
1892	22,749	22,801	23,274	7,753							
1893	22,793	22,781	22,762	22,749							
1894	22,813	22,789	22,858	22,813	12,567						
1895	22,891	22,922	22,913	22,936	13,629	3,571					
1896	23,178	30,906	23,232	23,183	20,735	21,051	13,572				
1897	22,750	23,202	30,912	23,185	20,745	25,370	21,119	14,382			
1898	23,646	23,178	23,184	23,199	20,842	21,080	21,080	20,851	21,318	7,569	
1899	23,178	23,205	22,477	30,135	20,082	20,926	20,956	17,448	18,285	14,669	7,628
Total	229,323	215,381	191,680	175,953	108,600	97,998	76,727	52,681	39,603	22,238	7,628

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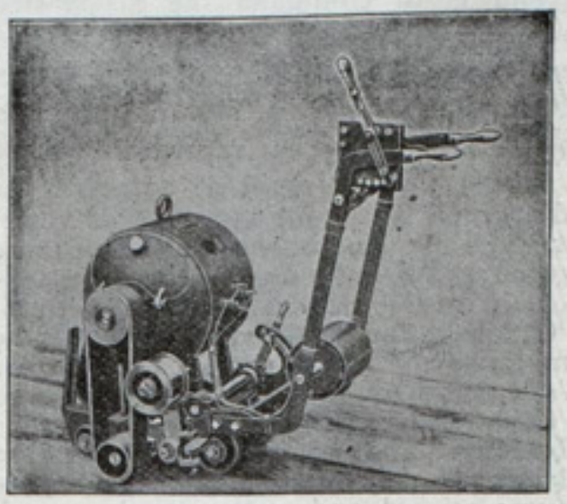

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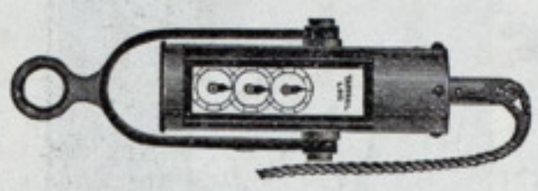

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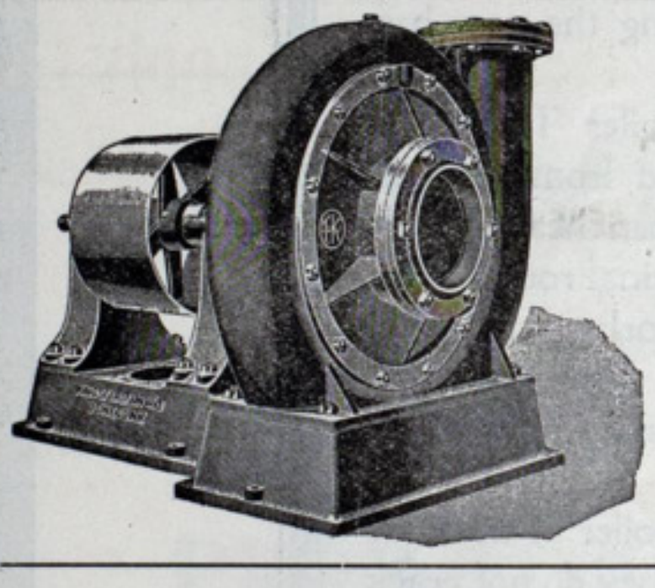

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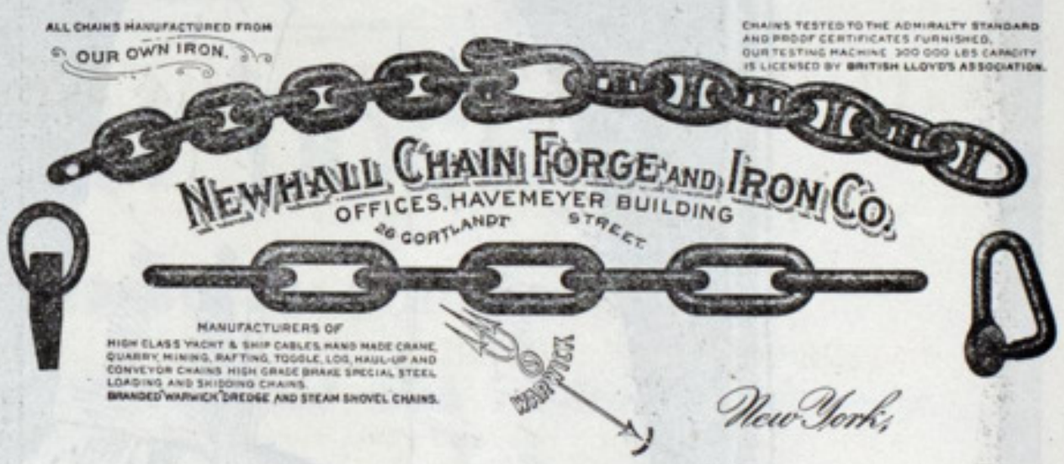

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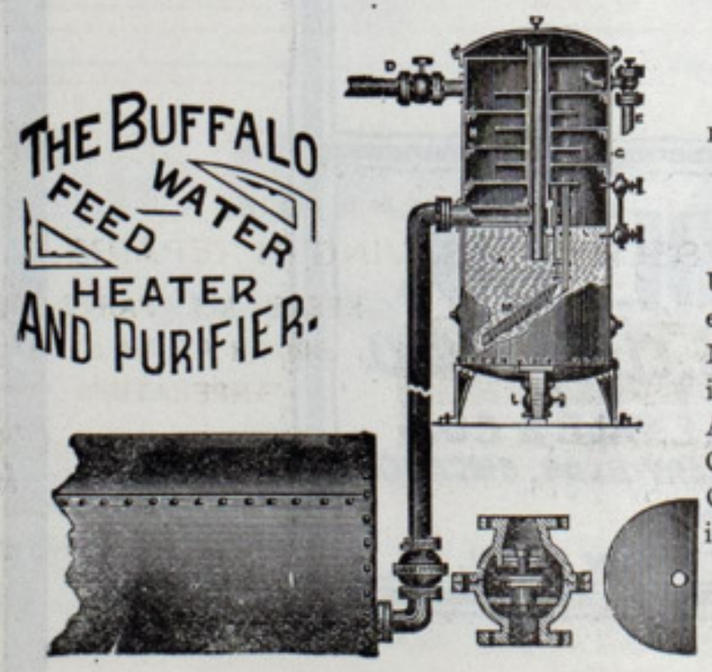

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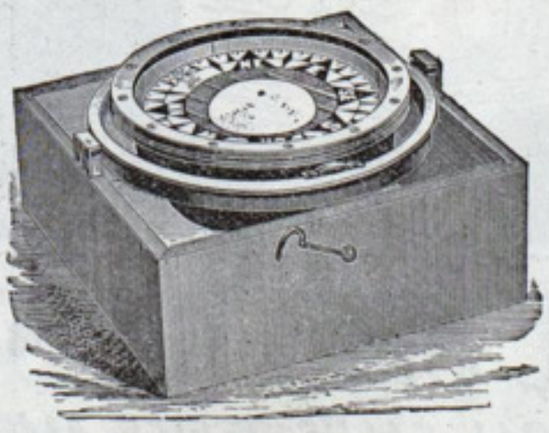

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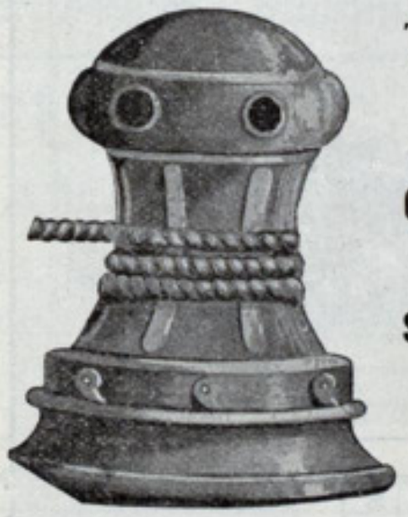

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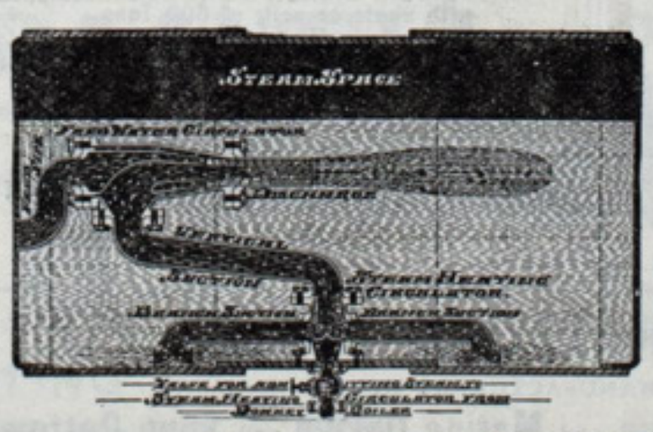

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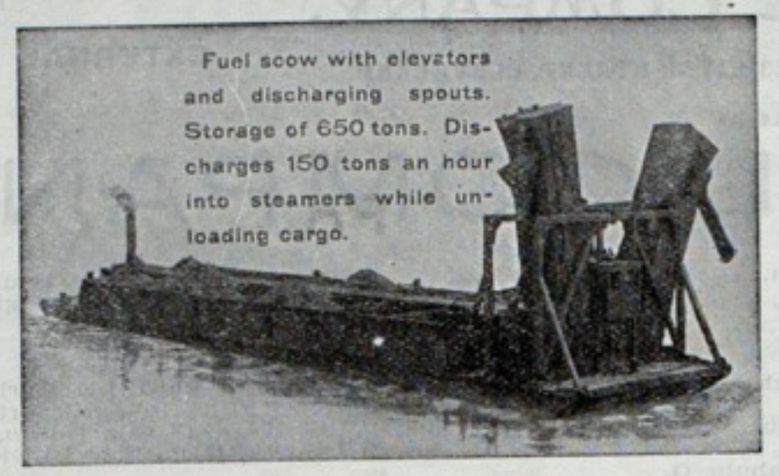

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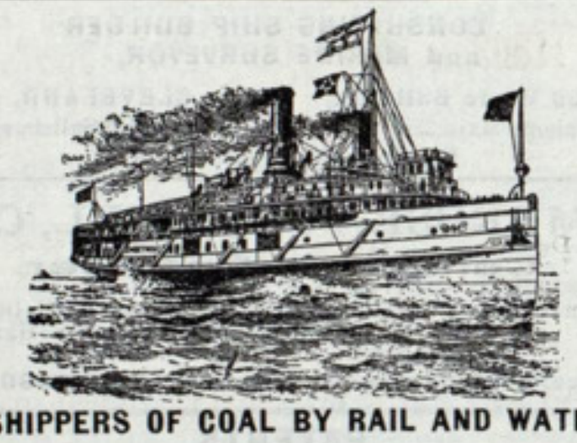

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American Steel & Wire Co.....Chicago.

RUBBER INSULATED WIRES.
Roebling's Sons, John A..New York and Cleveland.
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SAFETY VALVES.
American Steam Gauge Co.....Boston.
Ashton Valve Co.....Boston.
Crosby Steam Gage & Valve Co.....Boston.

SAIL MAKERS.
Baker, Howard H. & Co.....Buffalo.
Upson-Walton Co.....Cleveland.
Wilson & Silsby.....Boston.

SALVAGE COMPANIES.
See wrecking companies.

SCHOOLS, CORRESPONDENCE — ENGINEERING AND NAVIGATION.
American School of Correspondence.....Boston.
Chicago Nautical School.....Chicago.
International Correspondence Schools.....Scranton, Pa.

SCREW MACHINES.
Niles Tool Works Co.....Hamilton, O.

SEARCH LIGHTS.
Elwell-Parker Electric Co.....Cleveland.
General Electric Co.....Schenectady, N. Y.
Rushmore Dynamo Works.....Jersey City, N. J.
Westinghouse Electric & Mnfg. Co...Pittsburg, Pa.

SHAPERS.
American Tool Works Co. (The).....Cincinnati.
Niles Tool Works Co.....Hamilton, O.

SHEARS.
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Bourne-Fuller Co.....Cleveland.

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Atlantic Works.....East Boston, Mass.
Bath Iron Works, Ltd.....Bath, Me.
Buffalo Dry Dock Co.....Buffalo.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co.....Toledo, O.
Chicago Ship Building Co.....Chicago.
Detroit Shipbuilding Co.....Detroit.
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Jenks Ship Building Co.....Port Huron, Mich.
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Moran Bros. Co.....Seattle, Wash.
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Newport News Ship Bldg. Co...Newport News, Va.
Nixon, Lewis.....Elizabeth, N. J.
Pusey & Jones Co.....Wilmington, Del.
Risdon Iron Works.....San Francisco.
Roach's Ship Yard.....Chester, Pa.
Townsend & Downey Ship Bldg. Co.....New York.
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Union Dry Dock Co.....Buffalo.
Union Iron Works.....San Francisco.
Willard, Chas. P. & Co.....Chicago.

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Erie & Western Trans. Co.....Buffalo.
International Nav. Co.....Philadelphia.
Red Star Line.....New York.

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Bethlehem Steel Co.....So. Bethlehem, Pa.

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American Ship Building Co.....Cleveland.
Chase Machine Co.....Cleveland.
Detroit Shipbuilding Co.....Detroit.
Electro-Dynamic Co. .....Philadelphia.
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Queen City Engineering Co.....Buffalo.
Sheriffs Mfg. Co.....Milwaukee.

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Wright, Herbert & Co.....Cleveland.

STOCKLESS ANCHORS.
Baldt Anchor Co.....Chester, Pa.
International Anchor Co.....Cleveland.

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American Bridge Co.....New York.

SURVEYORS, MARINE.
Curr, Robert.....Cleveland.
Gibbs & Joys.....Milwaukee.

TELEGRAPH—DECK AND ENGINE ROOM.
Cory, Chas. & Son.....New York.

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Hunt, Robert W. & Co.....Chicago.
Pittsburgh Testing Laboratory, Ltd.....Pittsburgh.

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New Doty Mnfg. Co.....Janesville, Wis.
Niles Tool Works Co.....Hamilton, O.
Pelton Engineering Co.....Cleveland.
Philadelphia Pneumatic Tool Co.....Philadelphia.
Standard Pneumatic Tool Co.....Chicago.
Wood & Co., R. D.....Philadelphia.

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Woods Machine Co., S. A.....So. Boston.

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Chase Machine Co.....Cleveland.
Playfair's Barge & Tug Line.....Midland, Ont.

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Donnelly Salvage & Wrecking Co...Kingston, Ont.
Swain Wrecking Co.....Detroit.

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Shelby Steel Tube Co.....Cleveland.

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Ashton Valve Co.....Boston.
Crosby Steam Gage & Valve Co.....Boston.
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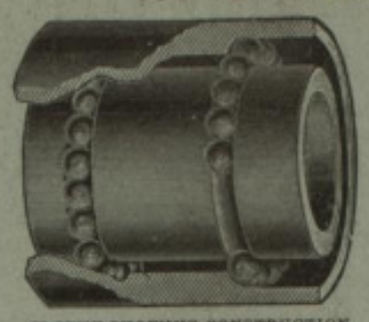

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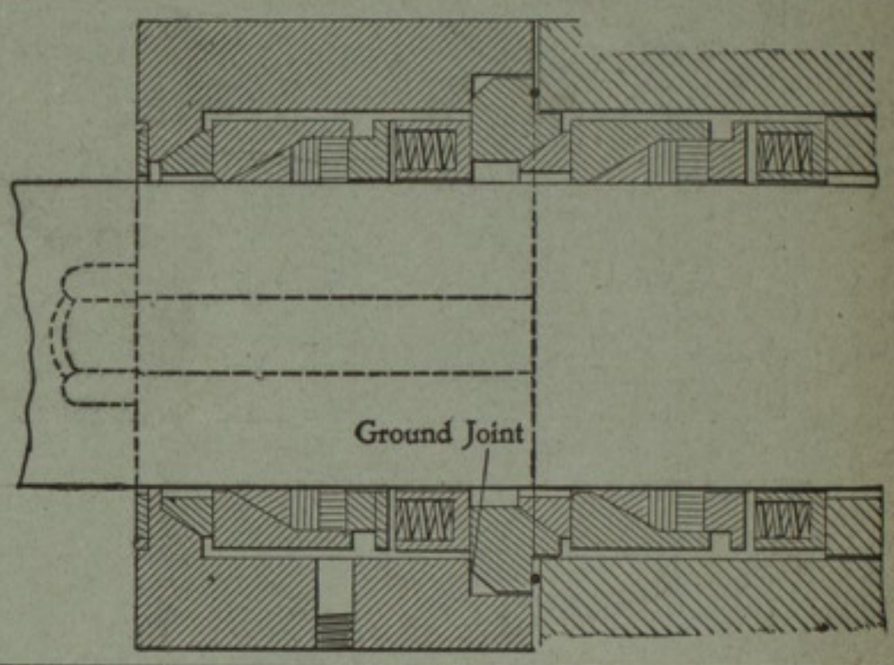

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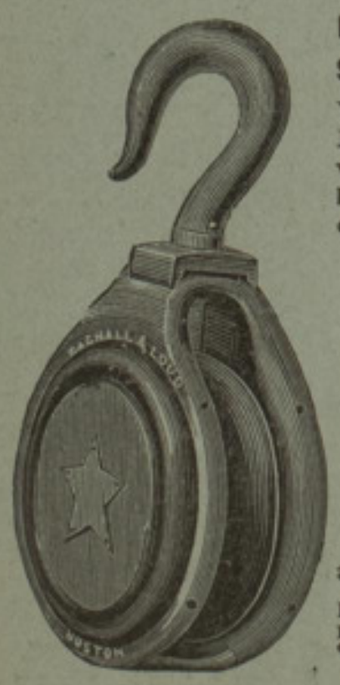

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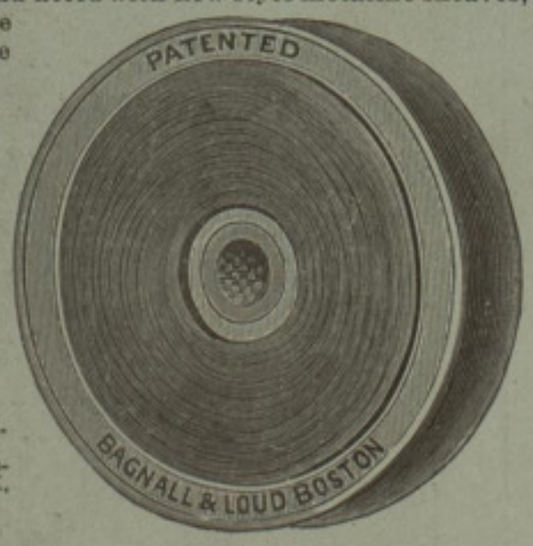

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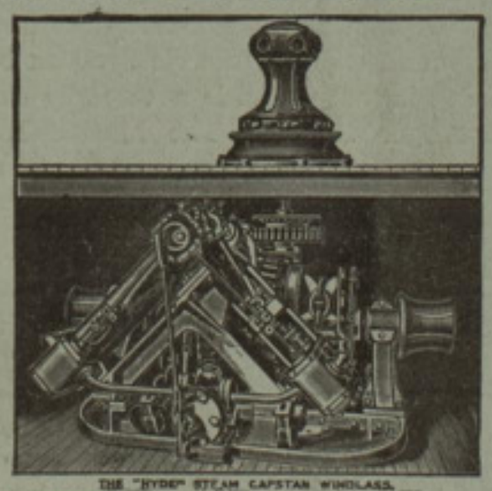

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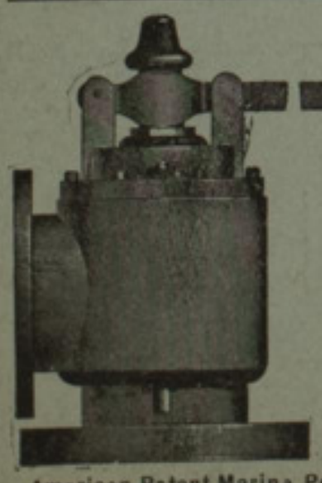

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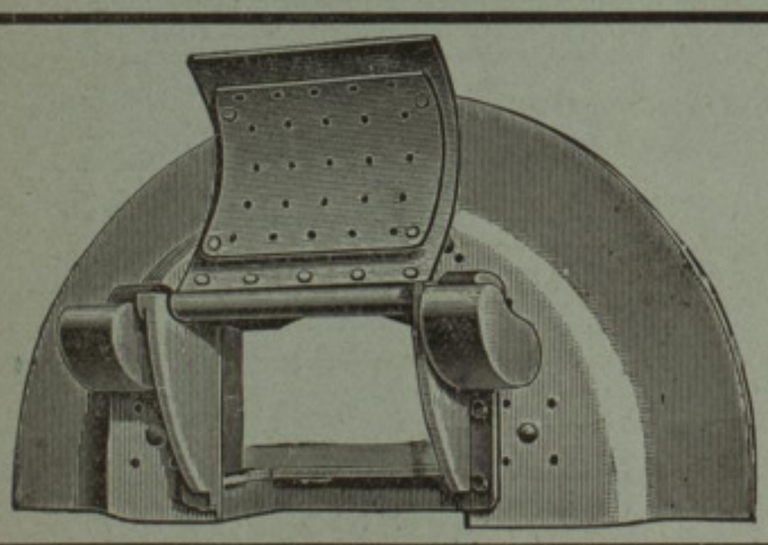

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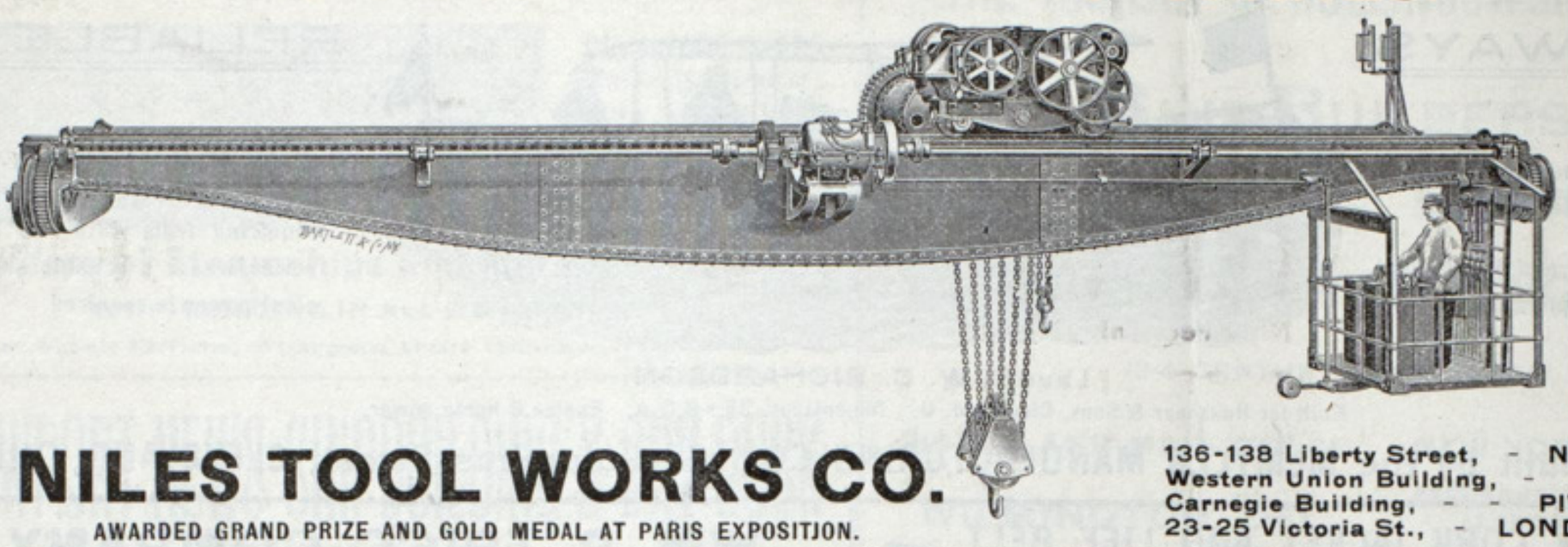

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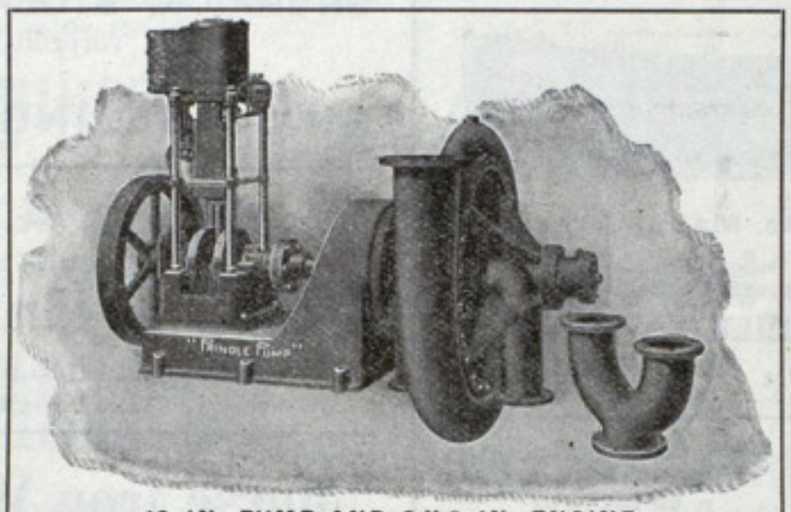

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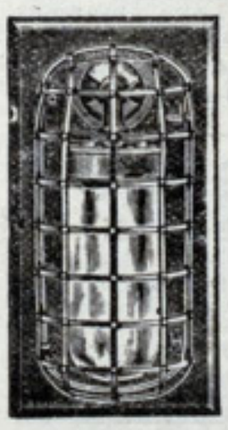

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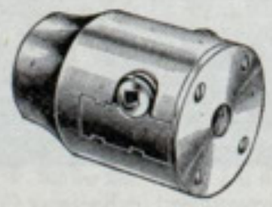

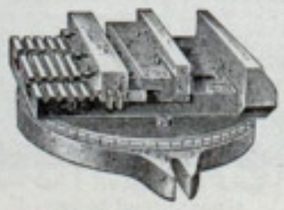

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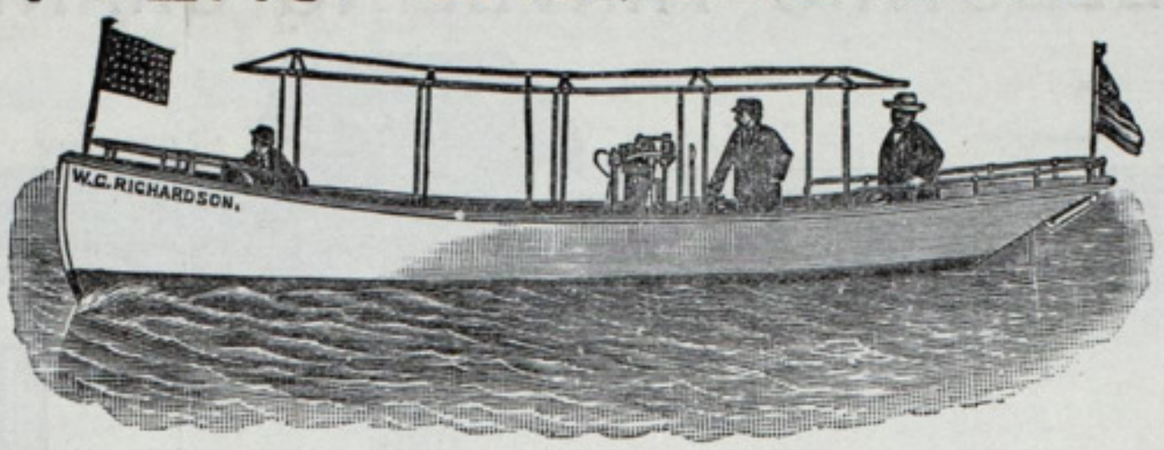

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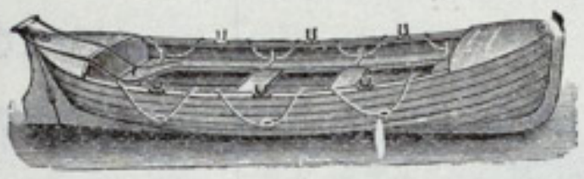

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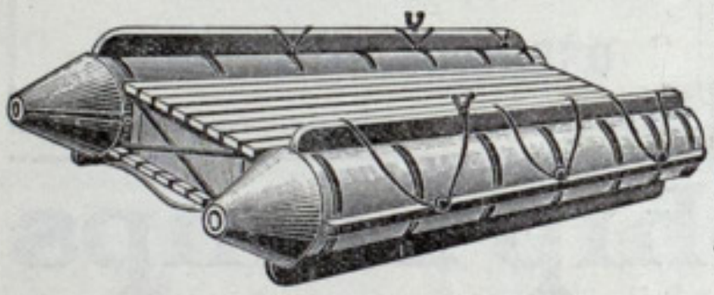

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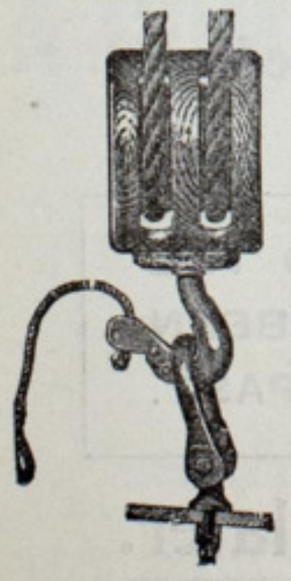

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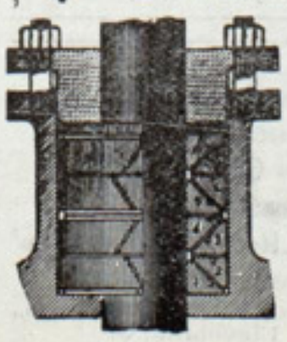

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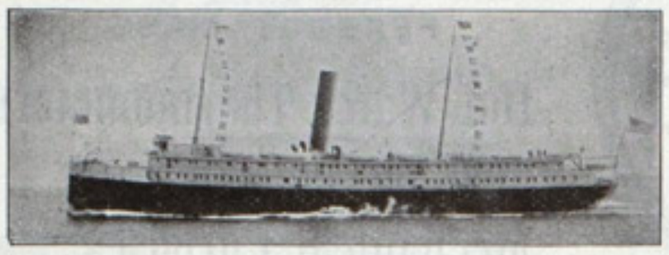

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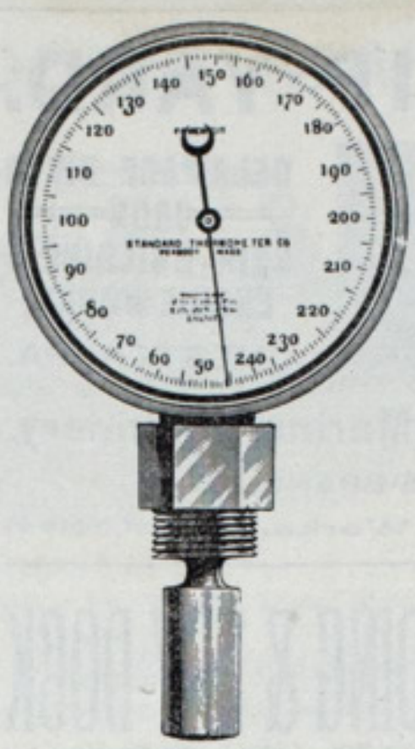

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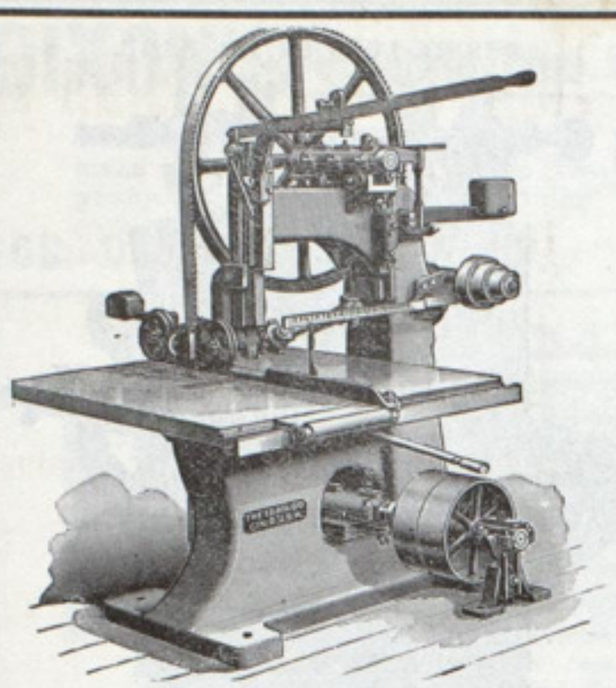

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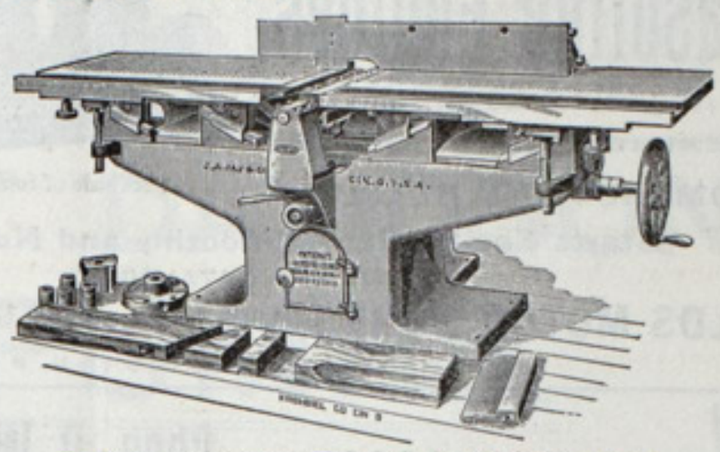

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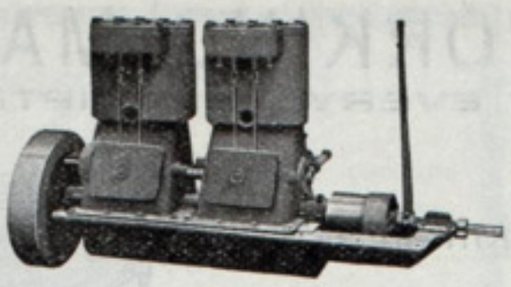

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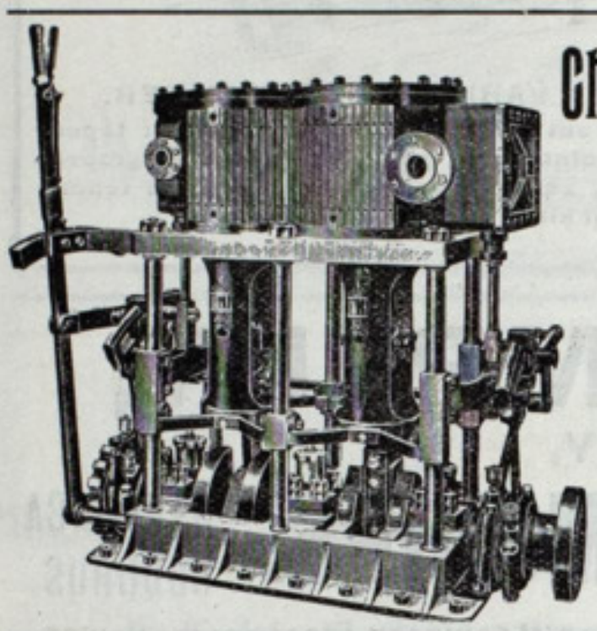

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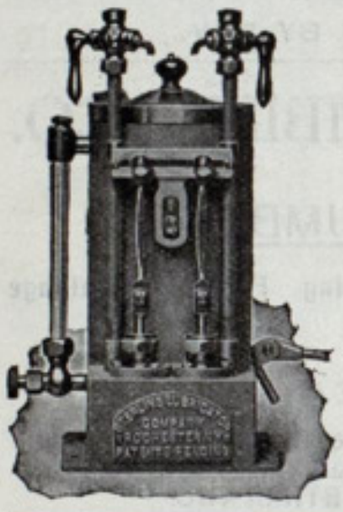

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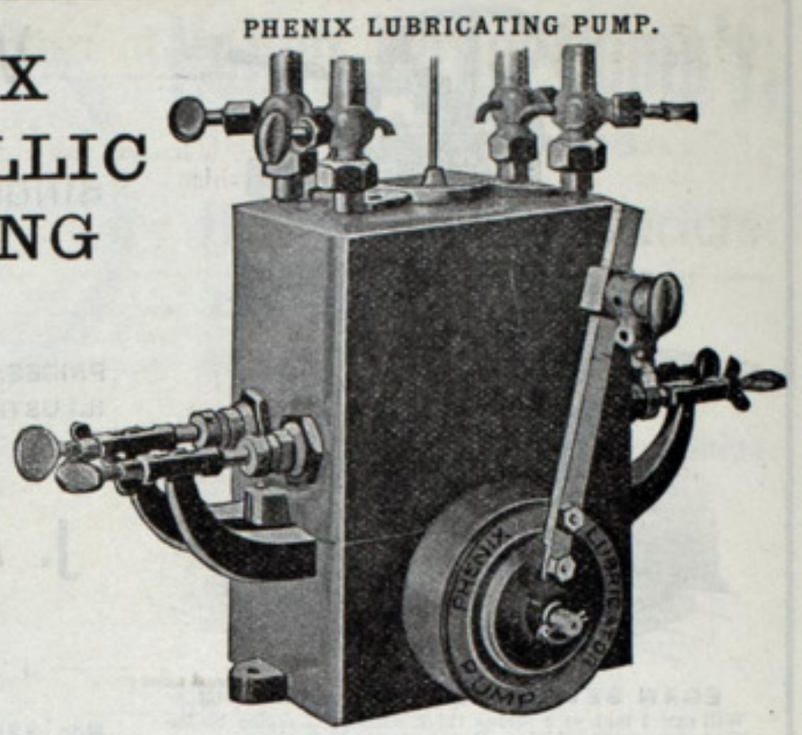

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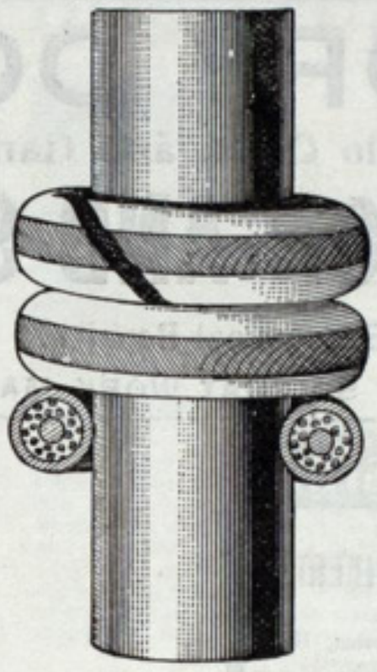

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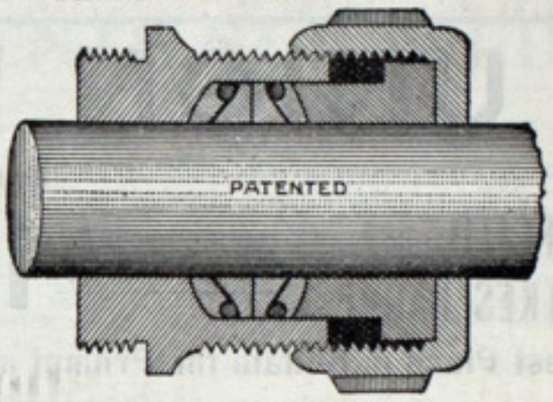

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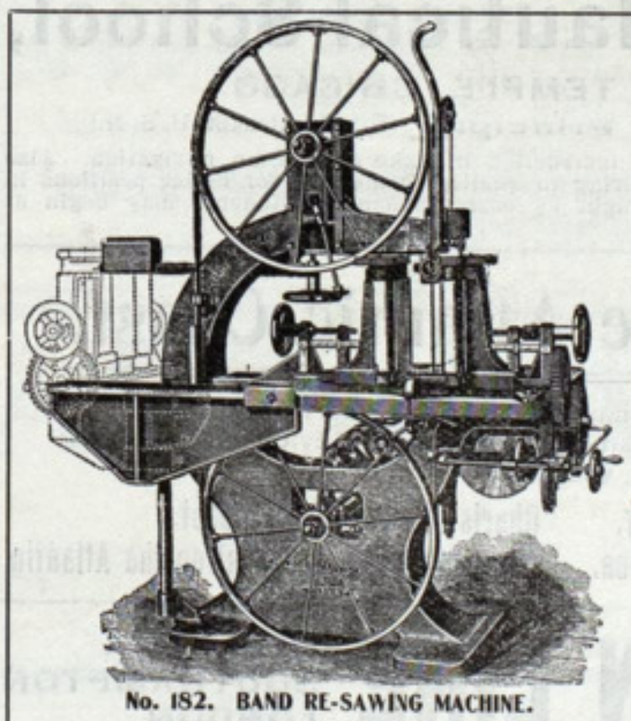

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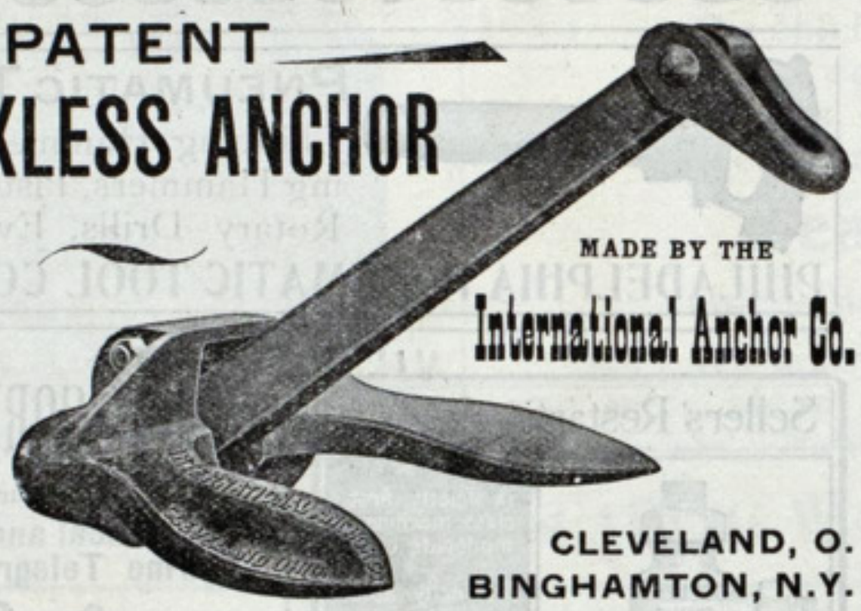

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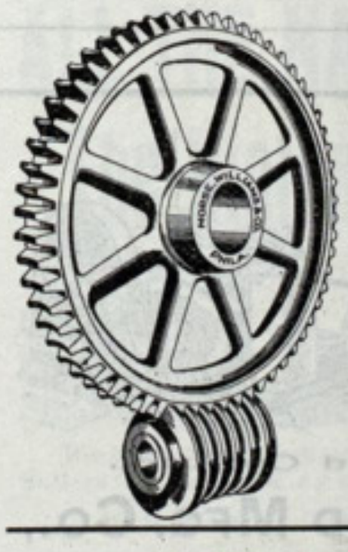

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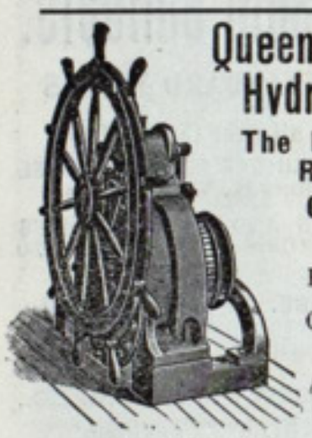

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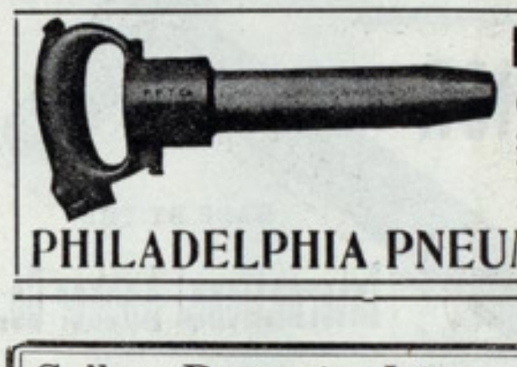

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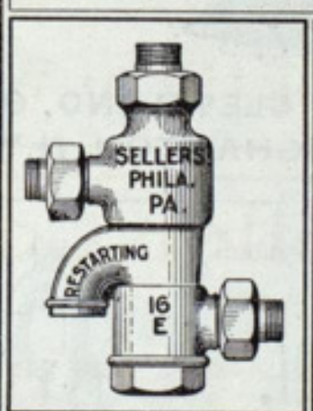

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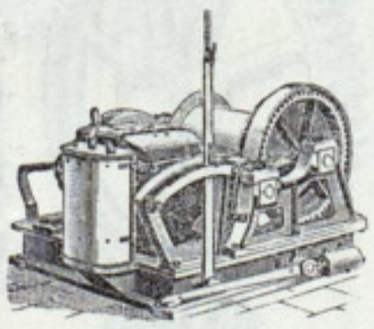

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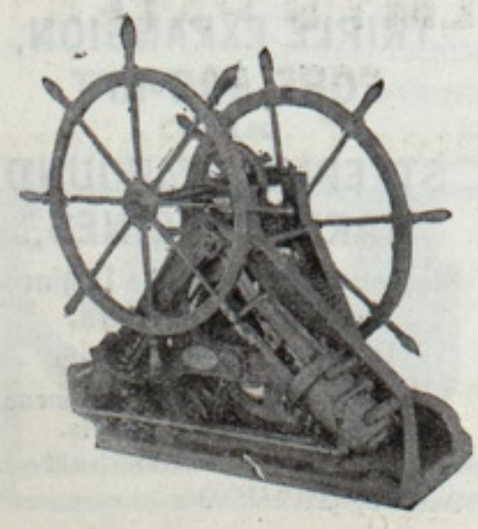

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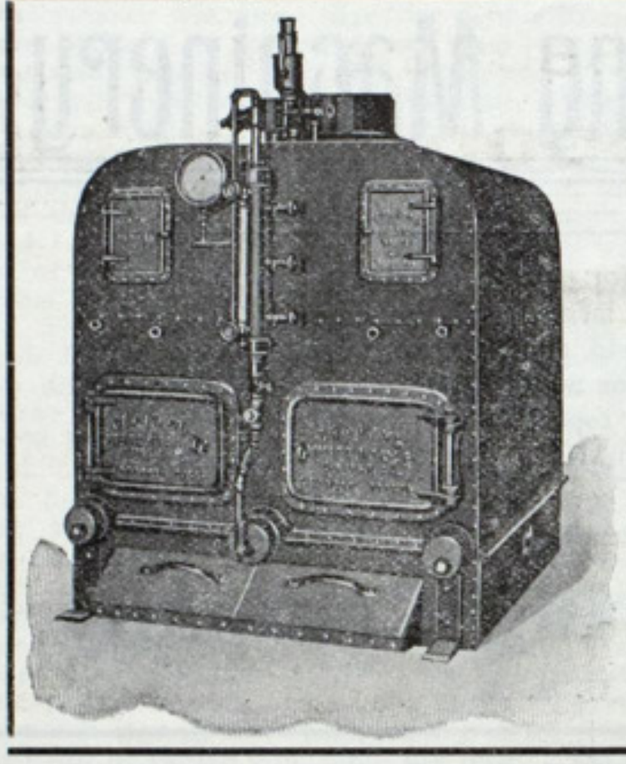

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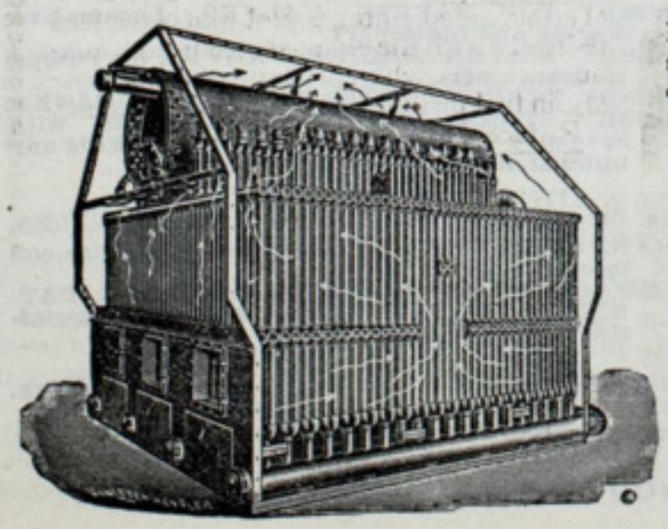

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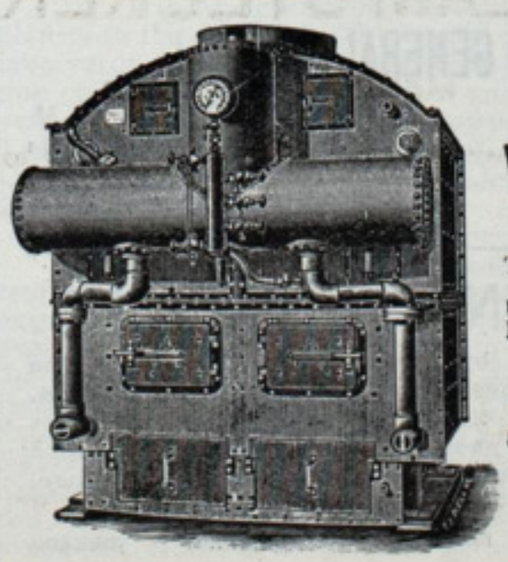

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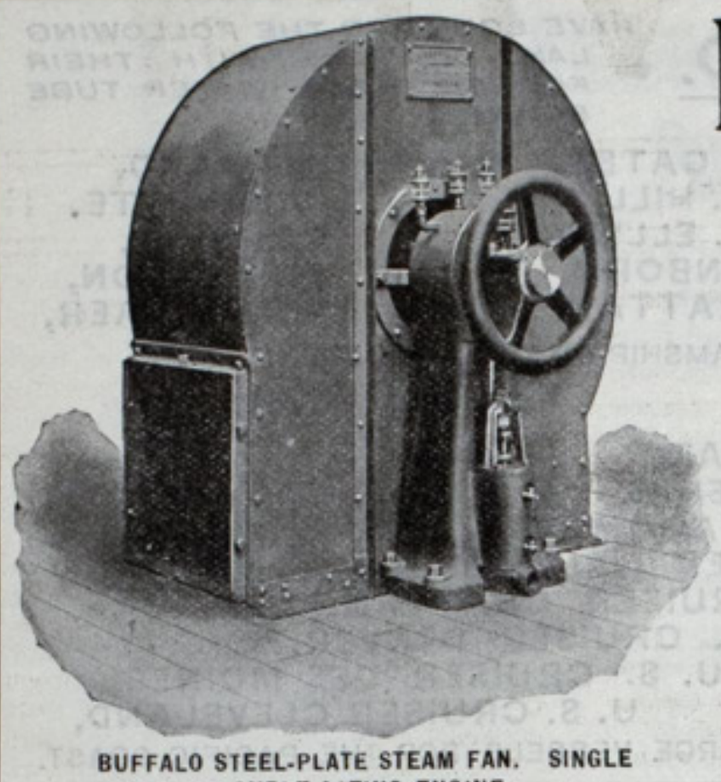

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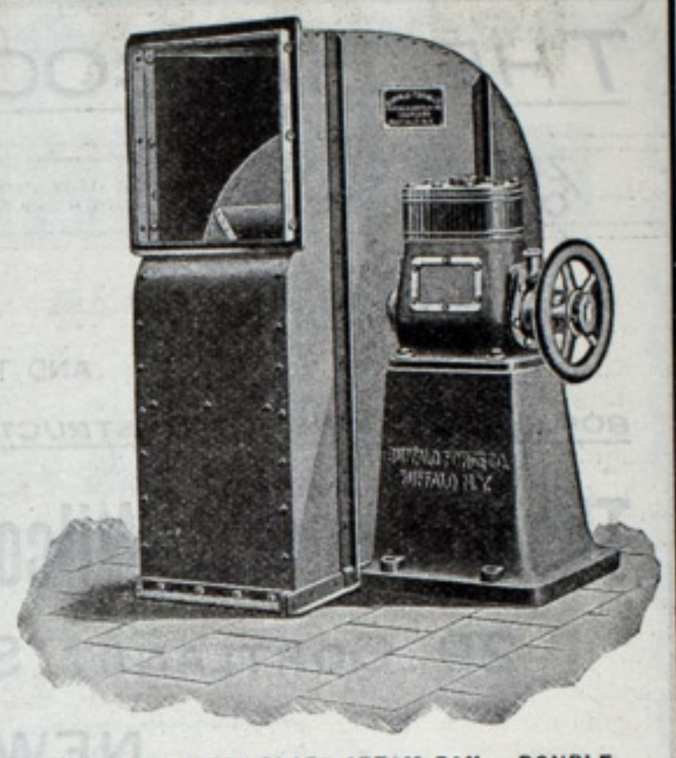

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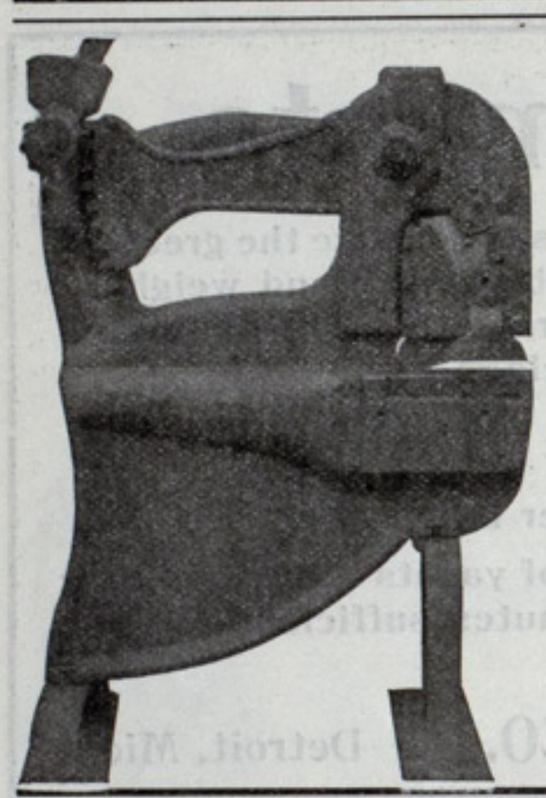

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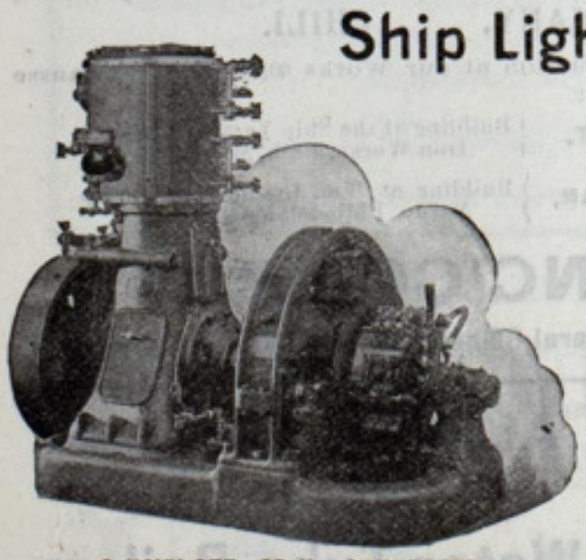

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